

EURO AUTOMATION

MICROSCAN[®]

MS-Q Handheld Imager User's Manual



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About the MS-Q Handheld Imager

The MS-Q Handheld Imager, with point and click triggering, can read both 1D and 2D symbols and transfer (or buffer and transfer later) decoded data by both cable and wireless. The MS-Q Handheld Imager is available in USB, RS-232, and PS2 interfaces.

The Quadrus version of the MS-Q Handheld Imager can be toggled between Quadrus firmware and Basic firmware modes by use of the top left button. Quadrus Mode is especially useful for DPM (Direct Part Mark) applications; Basic Mode offers all the functionality of the MS-Q Basic Imager, and can read several symbologies not available in Quadrus Mode.

About This Manual

This manual provides complete information on setting up, installing, and configuring the MS-Q Handheld Imager. The chapters are presented in the order in which the Imager would be assembled, configured, and optimized.

Chapter 1, **"Quick Start"**, provides overall step-by-step instructions for getting your Imager ready for operation, with specific references to other chapters and appendices.

Chapter 2, **"Using ESP"**, provides a quick introduction to Microscan's proprietary scanner and reader setup software. Each subsequent chapter includes additional specific information about **ESP**.

Highlighting

Commands, selections inside procedural instructions, and **ESP** menu defaults are highlighted in **rust bold**.¹

Cross-references are highlighted in **blue bold**. Web links and outside references are highlighted in **blue italicized bold**.

References to **ESP**, its toolbar headings (Communications, Read Cycle, Symbologies, etc.) and menu headings are highlighted in **Bold Initial Caps**. References to topic headings within this manual or other documents are enclosed in quotation marks.

Several different icons are used throughout the manual to highlight critically important information. A reference key for these icons appears below.



Warning/Danger: Indicates a potentially or imminently hazardous situation that, if not avoided, could result in serious injury.



Caution--R.F. Interference: Alerts users to potential radio frequency interference from the Imager in its active state.



Caution: Alerts users to the possibility of damage to equipment or data, or potential problems in the outcome of the procedure they are performing.



Important: Emphasizes a procedure that, if performed incorrectly, could result in data loss or unsuccessful operation of the Imager.



Warning/Danger--Laser: Alerts users to potential danger from laser emissions.



Note: Emphasizes a point or provides a reminder.

1. The digital version of this manual is in full color (Microscan Tools CD, P/N 37-000001-01).

Product Labels

The following labels are located on the MS-Q Quadrus Imager:

(Top)

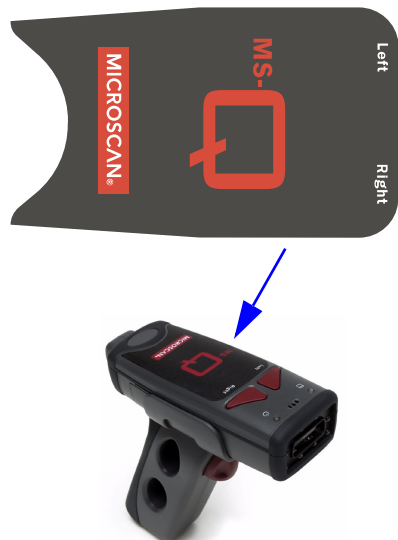


(Bottom)



The following labels are located on the MS-Q Basic Imager:

(Top)



(Bottom)



Statement of Agency Compliance



The MS-Q has been tested for compliance with FCC regulations and has been found to conform to all applicable FCC Rules and Regulations.



To comply with FCC RF exposure compliance requirements, this device must not be co-located or operate in conjunction with any other antenna or transmitter.



Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



The MS-Q has been tested for compliance with CE standards and guidelines and has been found to conform to applicable CE standards, specifically the EMC requirements EN 55024, ESD EN 61000-4-2, Radiated RF Immunity EN 61000-4-3, ENV 50204, EFT EN 61000-4-4, Conducted RF Immunity EN 61000-4-6, EN 55022, Class B Radiated Emissions, and Class B Conducted Emissions.

The MS-Q has been tested by an independent electromagnetic compatibility laboratory in accordance with the applicable specifications and instructions.

Warning and Caution Summary



The MS-Q can be set to use targeting lasers. If the targeting lasers are activated, do not stare into the beams. The MS-Q's targeting lasers have been rated as Class 2 Lasers by ANSI 2136.1-1993.



This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



Use of controls, adjustments, or performance of procedures other than those specified herein may result in hazardous laser light radiation exposure.



There are no user serviceable parts in the reader. Opening the reader voids the Microscan Systems warranty and could expose the user to laser diode power of up to 7mW.



The laser beam can be harmful to eyesight. Avoid eye contact with the laser beam. Never point the beam at other people, or in a direction where people may be passing.

Chapter

1

Quick Start

Chapter Contents

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This section is designed to get the MS-Q Handheld Imager up and running quickly so the user can get a sense of its capabilities and test sample symbols. Detailed setup information for configuring the Imager for your specific application can be obtained in the subsequent chapters.



Your interface type will determine how data is received by your host. When sending data by USB or PS2, you must open a text editor in your host computer. When sending data by RS-232 or Bluetooth you must use a terminal program such as HyperTerminal or **ESP's Terminal** feature (RS-232 only).

Preliminary Assembly

All MS-Q Handheld Imager configurations include a battery or battery blank, a handle, and a USB or PS2 cable. Either a battery or a battery blank must be installed for the MS-Q to operate.

If replacing the battery blank with a battery, see **"Installation Steps for Batch/Battery"** on page 1-7.

To assemble:



1. Slide the Imager into the handle's cradle, aligning the ridges on the inside of the cradle's parallel lateral stabilizers with the grooves along the sides of the Imager itself. Be sure that the handle cradle's 8-pin mini-DIN connector is inserted completely into the back of the Imager.
2. If using a cable, plug the cable into the bottom of the handle. Plug the other end of the cable into the corresponding port on your host computer.



When disconnecting the USB or RS-232 cable from the Imager, do not pull directly on the cable; grasp and pull on the connector housing to release the locking mechanism and disengage.



USB Interface



The USB interface draws its power from the host computer.

Hardware for USB

Item	Description	Part Number
1	MS-Q Handheld Imager	FIS-6100-0001 to -0006 or FIS-6150-0001 to -0003
2	USB Cable	included

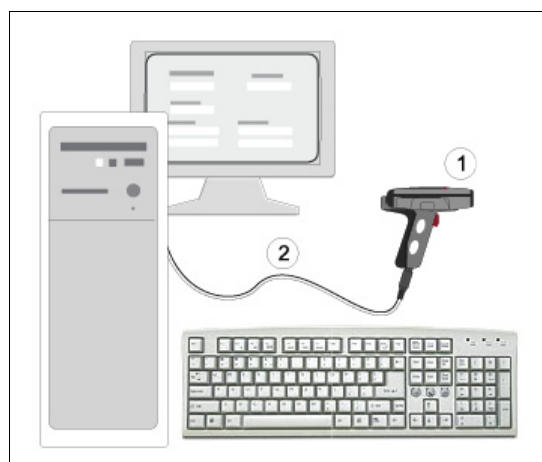
Installation Steps for USB

1. Connect the USB cable (**2**) to the MS-Q (**1**).
2. Connect the USB cable (**2**) to the host.
You **DO NOT** need to power off your host computer.
3. Open any program in your host computer that can receive keyboard text.
4. Read the **USB Keyboard Mode** symbol below:



M134_01

**USB Keyboard
Mode**



Hardware Required

5. Read the **Save Settings** symbol at the bottom of this page.

You are now ready to send data to the host.

Test Symbol

ABCDEFGHIJKLMNOP



If you attempt to connect to the host via USB *and you have a battery installed*, the host will fail to recognize the Imager for approximately 60 seconds. If you connect with a battery blank installed, or if you install the battery after plugging in, no delay occurs.

Save changes whenever you reconfigure Imager settings.



M188_02

Save
Settings



M049_01

Default
to USB



M060_01

Default
to PS2



M071_01

Clear
all Data



M052_01

Clear XML
Rules

PS2 Interface



Like USB, the PS2 interface draws its power from the host computer.

Hardware for PS2

Item	Description	Part Number
1	MS-Q Handheld Imager	FIS-6100-0007, FIS-6100-0008, or FIS-6150-0004
2	PS2 Cable	included

Installation Steps for PS2

1. Power-off the host and disconnect the keyboard.
2. Attach the MS-Q cable connector (**2**) to the MS-Q (**1**).
3. Attach the keyboard connector to the keyboard cable and host computer as shown.
4. Power-on the host.
5. Read the **PS2 Mode** symbol below:



M126_01

PS2 Mode

This connection protocol provides power to the MS-Q, and, when attached, will allow data input from both the MS-Q and the keyboard.



Hardware Required

6. Read the **Save Settings** symbol at the bottom of this page.

You are now ready to send data to the host.



The MS-Q Handheld Imager *must* be connected to the keyboard for the Imager and the keyboard to function in **PS2 Mode**.

Test Symbol

ABCDEFGHIJKLMNP



Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

RS-232 Interface



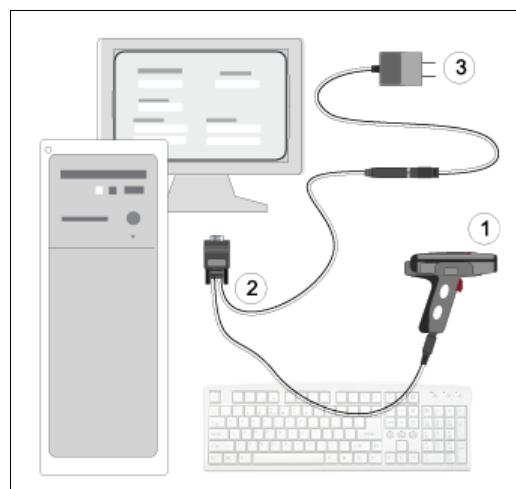
Unlike USB and PS2, the RS-232 interface does not draw its power from the host computer.

Hardware for RS-232

Item	Description	Part Number
1	MS-Q Handheld Imager	FIS-6100-0001 to -0006 or FIS-6150-0001 to -0003
RS-232 Kit includes:		98-000074-XX
2	RS-232 Cable	
3	Power supply	

Installation Steps for RS-232

1. Power-off the host computer.
2. Connect the 8-pin mini-DIN on the RS-232 cable (**2**) to the MS-Q (**1**).
3. Connect the 9-pin D-sub connector to the host computer's serial port.
4. Connect the RS-232 cable to the power supply cable.
5. Plug in the power supply (**3**) and power-on the host computer.
6. Start up a terminal program (such as HyperTerminal or **ESP's Terminal** feature) and set to **57.6K** baud, **8** data bits, **none** parity, **1** stop bit, and **none** hardware.
7. Read the **RS-232 Mode** symbol below.



Hardware Required



M131_01

RS-232 Mode

8. Read the **Save Settings** symbol at the bottom of this page.

You are now ready to send data to the host.

Test Symbol

ABCDEFGHIJKLMNPO



Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

Clear all Data



M052_01

Clear XML Rules

Bluetooth Interface



Unlike USB, the Bluetooth interface does not draw power from the host computer. Bluetooth is not supported by Microscan's ESP software.

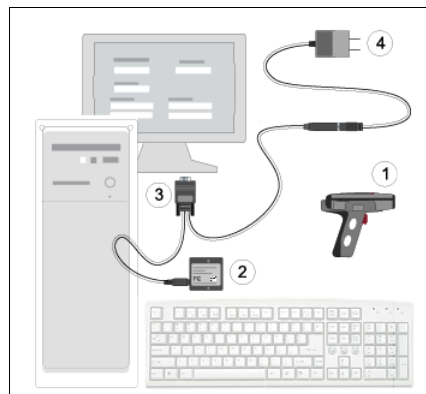
Hardware for Bluetooth

Item	Description	Part Number
1	MS-Q Handheld Imager (with battery)	FIS-6100-0006 or FIS-6150-0003
Bluetooth Kit includes:		98-000076-XX
2	Bluetooth Modem	
3	RS-232 cable	
4	Power supply	

Installation Steps for Bluetooth

1. Power-off your host computer.
2. Connect the 8 pin mini-DIN to the Bluetooth modem (**2**).
3. Connect the 9-pin D-sub connector (**3**) to your host computer's serial port.
4. Connect the RS-232 cable to the power supply cable (**4**).
5. Plug-in the power supply (**4**) and power-on your host computer.
6. Start up a communications program (like HyperTerminal or **ESP's Terminal** feature) and set to **9600** baud, **8** data bits, **none** parity, **1** stop bit, and **none** hardware.
7. Read the **RF Two-Way Mode** symbol to the right.
8. Next read the symbol on the Bluetooth modem's **TOP** label (**2**).
9. Read the **Save Settings** symbol at the bottom of this page.

You are now ready to send data to the host.



Hardware Required



M129_02

RF Two-Way Mode

Test Symbol

ABCDEFGHIJKLMNOP



Save changes whenever you reconfigure Imager settings.

Clear XML Rules



M052_01

Clear all Data



M071_01

Default to PS2



M060_01

Default to USB



M049_01

Save Settings



M188_02

Batch/Battery Interface

Overview

In Batch Mode a battery replaces the blank inside the MS-Q Imager. The MS-Q is capable of reading more than 4000 times from a single battery charge without being physically connected to the host. When you do connect (either by cable or wireless), the buffered data is transferred to the host in the manner determined by your batch setup.

Hardware for Batch/Battery

Item	Description	Part Number
1	MS-Q Handheld Imager	FIS-6100-0002, -0005, -0006 FIS-6150-0003
2	Battery	included

Installation Steps for Batch/Battery

1. Remove the battery blank by sliding the latch back while lifting the blank free.
2. Install the battery by inserting the tabbed end first, holding the sliding latch back while firmly pressing the battery into place.
3. Secure the battery with the sliding latch.
4. Select one of the modes in "Batch Setup" below.
5. When convenient or when the buffer is full, open any Windows-based program that can accept keyboard text (for USB or PS2) or a terminal program (for RS-232 or Bluetooth) on your host computer.
6. Attach a cable or connect to Bluetooth to download the buffered data.



Batch Setup

Send & Log Mode (preferred)



M076_01

If you read the **Send & Log Mode** symbol to the left, all buffered data will be downloaded to the host but retained in the Imager's memory whenever you connect.

Send and Buffer Mode (default)

If you read the **Send & Buffer Mode** symbol to the right, all buffered data will be downloaded to the host and **ERASED** in the Imager whenever you connect.



M075_01



You must have a data collection program open before connecting in **Send & Buffer Mode** or all buffered data will be lost.

Save changes whenever you reconfigure Imager settings.



M188_02

Save
Settings



M049_01

Default
to USB



M060_01

Default
to PS2



M071_01

Clear
all Data



M052_01

Clear XML
Rules

Install ESP

(**ESP** stands for *Easy Setup Program*.)

ESP is Microscan's proprietary reader setup and testing software. It is *not* meant to be a tool for a real-time production environment; the purpose of **ESP** is to provide a quick and easy way to set up and configure your reader.

With your Imager connected to a host computer (Windows™98 or higher), you can use **ESP** for configuration and Imager control.

1. Insert your "Microscan Tools" CD into your computer's CD drive.
2. Launch **Setup.exe** under **ESP** and follow the prompts.

If downloading from the web:

- a) Go to <http://www.microscan.com/mymicroscan>
 - b) Create a new "myMicroscan" member account or, if you are already a member, enter your user name and password.
 - c) Follow the prompts in the Download Center and choose a download option (**ZIP** or **EXE**).
 - d) Extract the **ESP** files to a directory of your choice.
3. Note where your "ESP.exe" file is stored on your hard drive.

At the end of the installation process, you should see the following icon on your desktop:



ESP supports only USB and RS-232 interfaces. The Imager must be in one of the modes below to communicate with **ESP**. Bluetooth is not supported.

USB	USB Mode  M133_01
RS-232	RS-232 Mode  M131_01

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

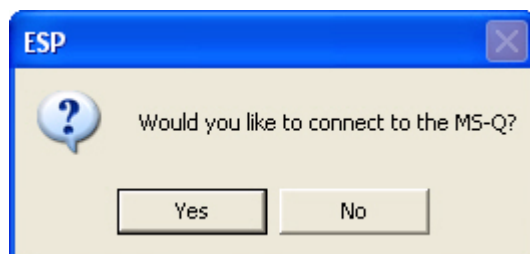
Select Model

When you start **ESP**, the following menu will appear:



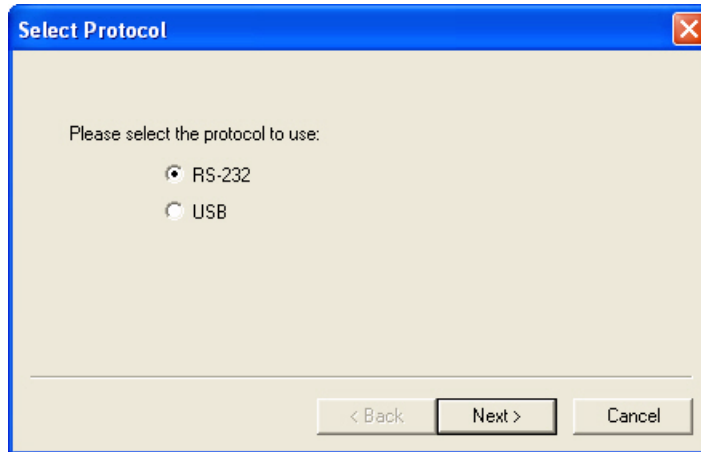
If you need to select another model later, click the **Switch Model** icon at the top of the screen.

1. Select **MS-Q** from the menu and click **OK**. If you do not want to make this selection every time you load **ESP**, uncheck **Show this window at Startup**.
2. Select the default name, **MS-Q-1**, for example, or type a name of your choice and click **OK**.
3. Click **Yes** when the following dialog appears:

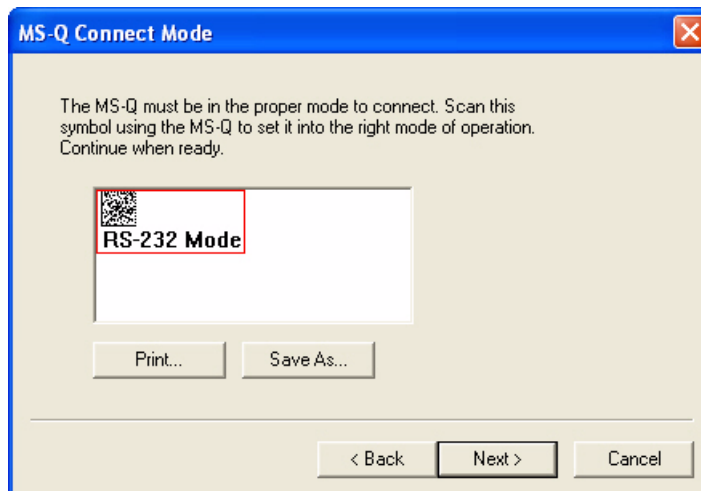


Select Protocol

4. In the **Select Protocol** dialog box, select the appropriate connection protocol and click **Next**.

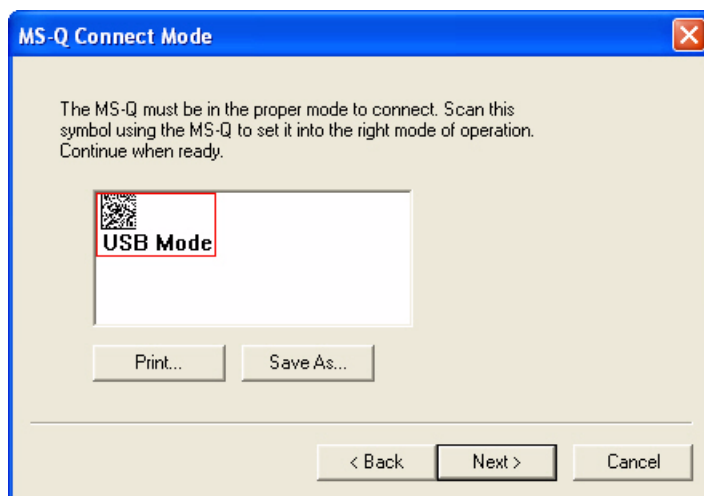


5. If you are using RS-232 protocol, the following dialog will appear:



Print the "RS-232" symbol and read it with the Imager to ensure that you are in the proper communications mode. Save the printed symbol for your convenience. Click **Next** when you are finished.

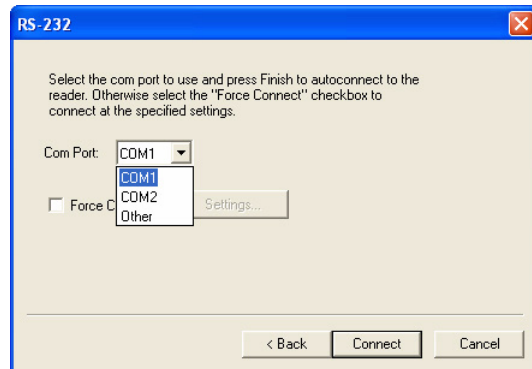
If using USB protocol, the following dialog will appear:



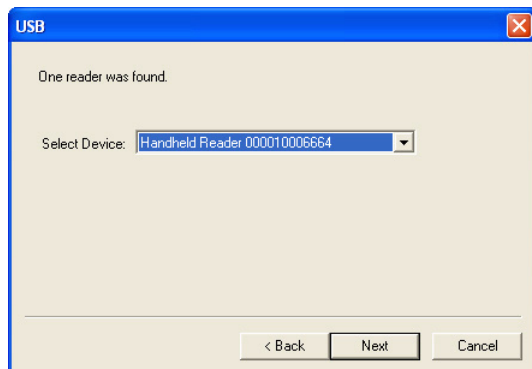
Print the "USB" symbol and read it with the Imager to ensure that you are in the proper communications mode. Save the printed symbol for your convenience. Click **Next** when you are finished.

Connect to Imager

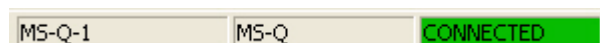
6. If you are using RS-232 protocol, select which communications port you are using. If **COM1** is not your communications port, select **Other** from the drop-down menu. Click **Connect**.



If using USB protocol, select your Imager model and click **Next**.



7. When connected successfully, the **CONNECTED** message will appear in a green box in the status bar at the bottom right of the screen.



8. If the connection attempt fails, enable a different communications port, check port connections, and try again.

You are now ready to configure your Imager with **ESP**. Subsequent chapters provide more detailed information about **ESP**'s configuration options.

Chapter

2

Using ESP

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Send/Receive	2-11

ESP is Microscan's proprietary reader setup and testing software. It is *not* meant to be a tool for a real-time production environment; the purpose of **ESP** is to provide a quick and easy way to set up and configure your reader.

This section is designed to help you understand the structure, elements, and application of **ESP** (Easy Setup Program).

When you start **ESP**, unless otherwise specified, you will enter **EZ Mode**. From there, you move easily into **App Mode** (Application Mode) where you can access several configuration menus.



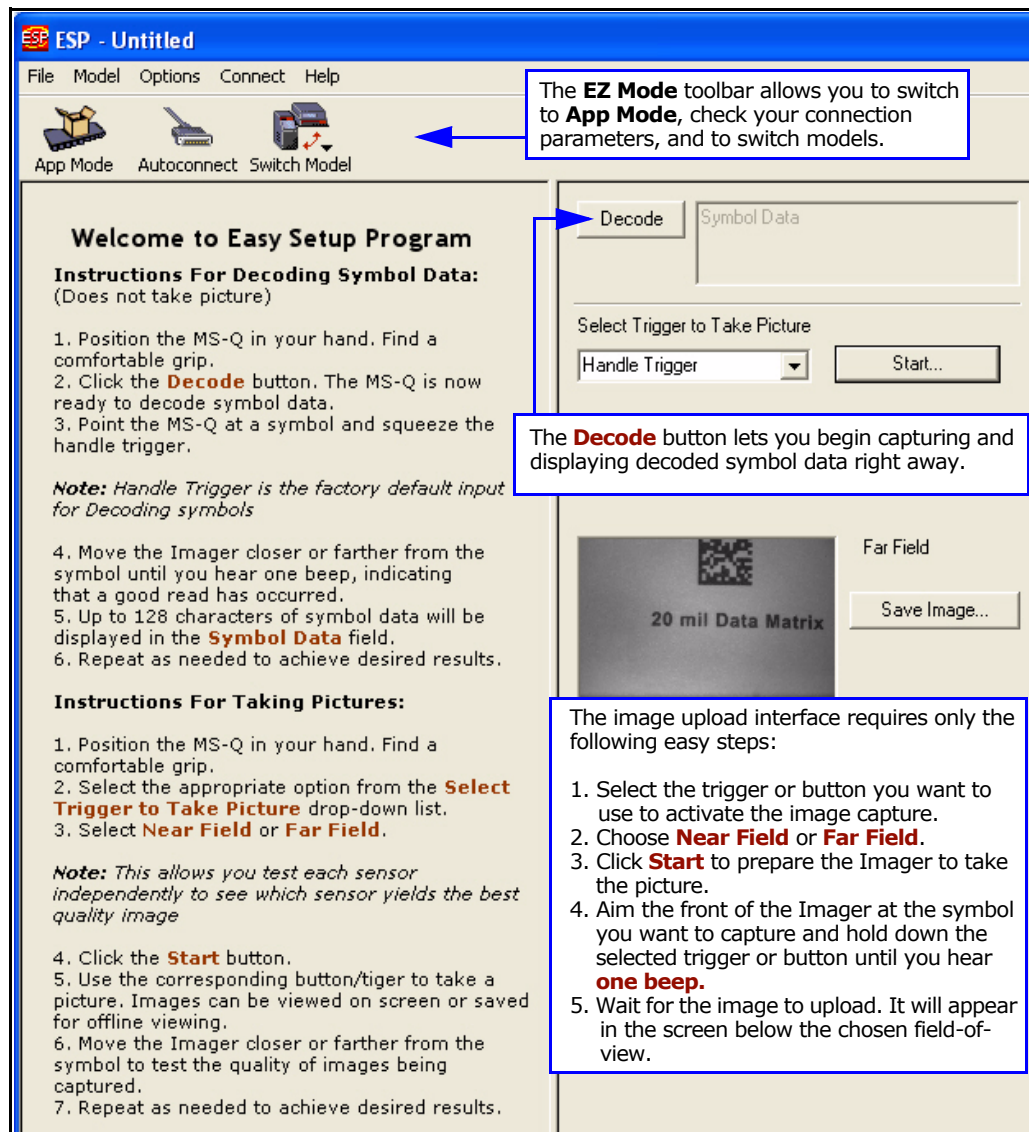
ESP will only operate with Microscan products. Bluetooth is not supported.



When **ESP** is connected to the MS-Q Handheld Imager and the Imager is in **Quadrus** Mode, **ESP** will show features that are available for **Quadrus** only.

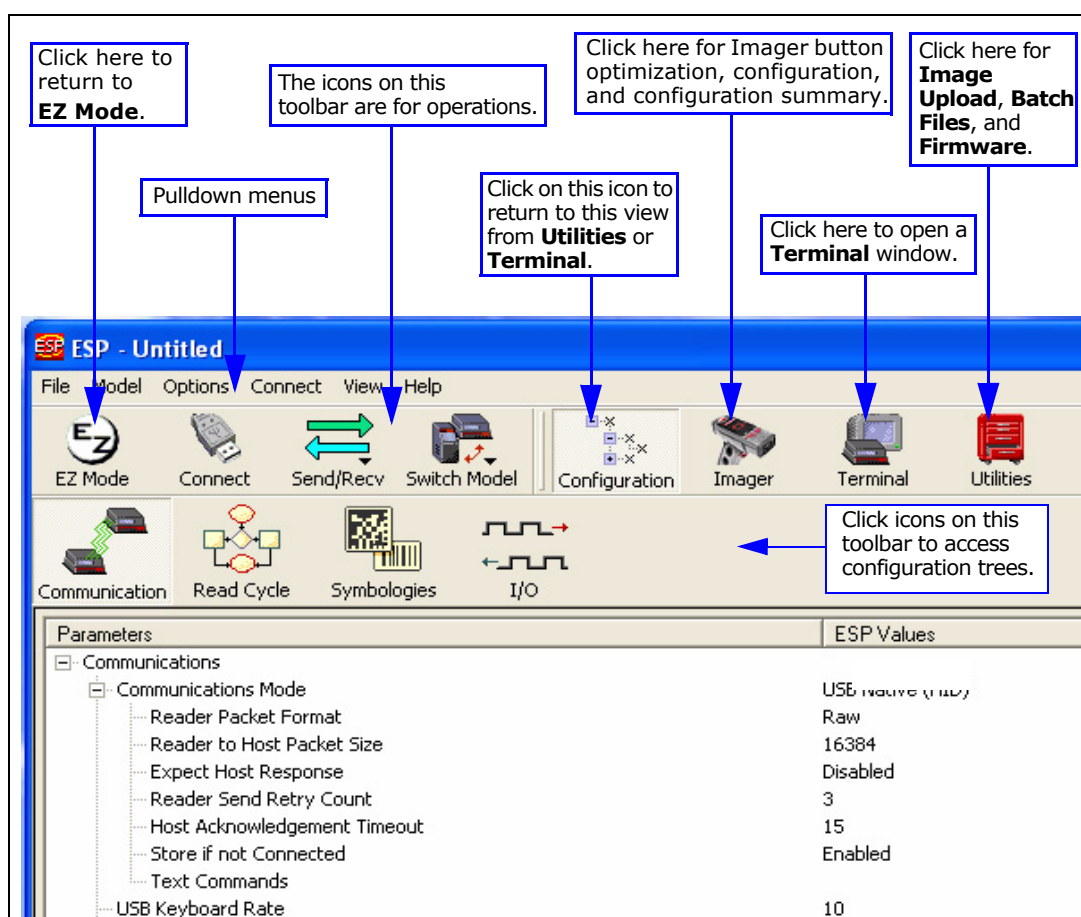
EZ Mode

When you first connect to **ESP** you will see the **EZ Mode** screen. **EZ Mode** is intended to help you get your Imager up and running within a few minutes, and to acquaint you with the MS-Q/**ESP** interface.



Application Mode

Application Mode gives you access to a robust configuration environment, including tree controls that let you make precise changes to operation parameters, and graphic interfaces that make configuring your Imager easy and intuitive.



For specific information on any of the icons shown above in the operations bar or configuration bar, see corresponding chapters in this manual.

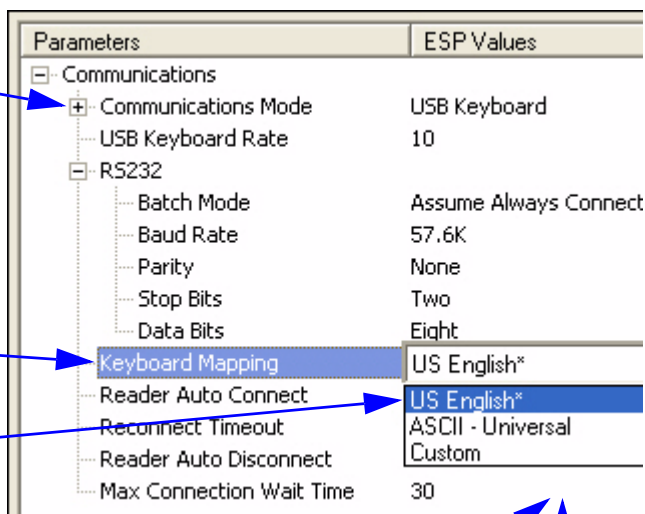
Configuration Trees

To make changes to configuration settings in the menu trees:

1. **Left click** on the + to expand the tree.

2. **Double click** on the parameter and click once in the selection box to view options.

3. Place your cursor in the selection box, scroll down to the setting you want to change and **click once** on the setting.



4. **Left click** again on the open screen to complete the selection.

5. **Right click** on the open screen and select **Save to Reader** to implement the command in the reader.



ESP supports only USB and RS-232 interfaces. The Imager must be in one of the modes below to communicate with **ESP**. Bluetooth is not supported.

USB	USB Mode	 M133_01
RS-232	RS-232 Mode	 M131_01

Pulldown Menus

File

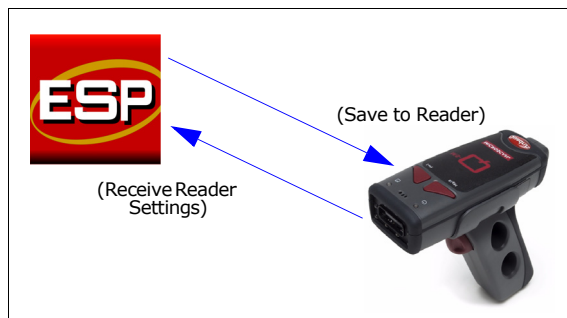
New

Whenever **New** is selected from the **File** menu, the default configuration of **ESP** is loaded.

Open / Save

When **Save** or **Save As** is selected, the **ESP** configuration is saved to the host computer's hard drive and available whenever the same file is selected under **Open**.

When you save menu changes to your hard drive, these changes are not saved to your Imager. The diagram below shows how settings can be saved and received between **ESP** and the Imager, and **ESP** and the host hard drive.



File	Model	Options
New		Ctrl+N
Open...		Ctrl+O
Save		Ctrl+S
Save As...		
Print...		Ctrl+P
Import...		
Export...		
1 Untitled.esp		
Exit		

Import / Export

Import converts the ASCII settings from a text file to **ESP** configuration settings.

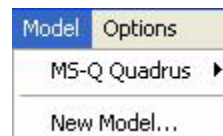
Export converts the active **ESP** configuration settings to an ASCII text file.

Pulldown Menus

Model

The **Model** menu allows you to select between reader or scanner models. When you choose another model, the current connection with your present model will be terminated.

To connect to another model, select **New Model**, choose the model you want, and click **OK**.



All models you have selected and enabled will continue to appear in the Model menu. The Model menu and the **New Model** option are repeated when you click the **Switch Model** icon.



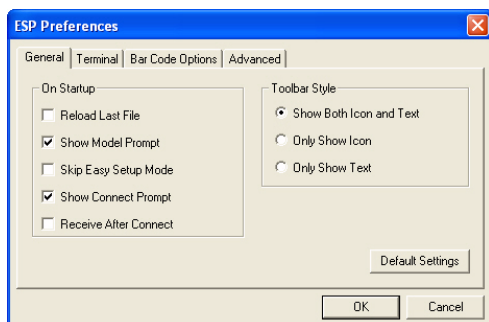
Options

You can use the **Options** menu to save memos and set up **ESP** preferences.



Preferences will be saved and loaded into **ESP** the next time **ESP** is opened, whether or not you save the **ESP** file to the host computer.

Preferences



General tab

On Startup

Reload Last File

At startup, reloads the last file saved to the computer.

Show Model Prompt

At startup, remembers the last connected model and displays it in the **Connecting...** dialog whenever you attempt to connect.

Skip EZ Mode

At startup, skips **EZ Mode** and opens directly in **App Mode**.

Show Connect Prompt

At startup, displays the **Would you like to connect...** prompt.

Receive After Connect

At startup, loads the reader or scanner's settings into **ESP**. (This is not recommended if you want to preserve your **ESP** settings for future use.)

Toolbar Style

Show Both Icon and Text (default)

Sets the toolbar to display icons and names of all operations.

Only Show Icon

Sets the toolbar to display only icons representing operations, without text.

Only Show Text

Sets the toolbar to display names of operations only, without icons.

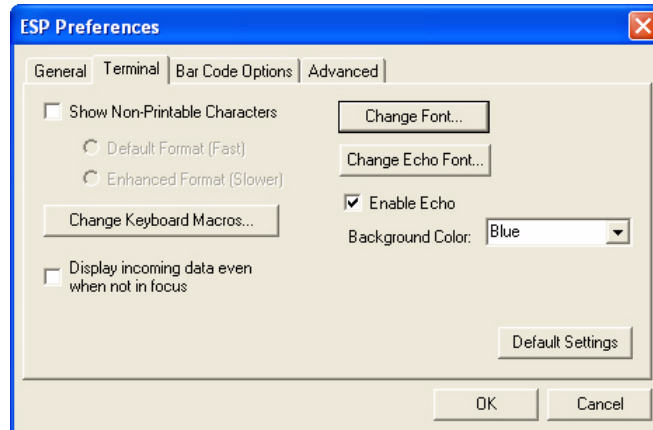
Pulldown Menus

Terminal tab

When **Show Non-Printable Characters** is checked, characters such as 'CRLF' will be displayed in the terminal window. When the **Enhanced Format** radio button is checked, more detail is given in the characters shown.

When **Display incoming data even when not in focus** is checked, all symbol data is displayed in the **Terminal** window.

When **Enable Echo** is checked, the **Terminal** window displays data that is returned from the Imager.



Change Keyboard Macros

In this dialog you can first select the function key and then enter your macro keystrokes in the associated key map. For example, to make Ctrl-F5 the keystroke to enable send a trigger character, select **F5**, then in the Ctrl row, enter **<trigger character>** and click **OK**. Then whenever the Ctrl-F5 keystroke is pressed, the trigger character will start the read cycle.

Change Font

Sets the font characteristics for the commands that you type in the terminal window.

Change Echo Font

Sets the font characteristics for text that is echoed back to the screen from the Imager.

Bar Code Options tab

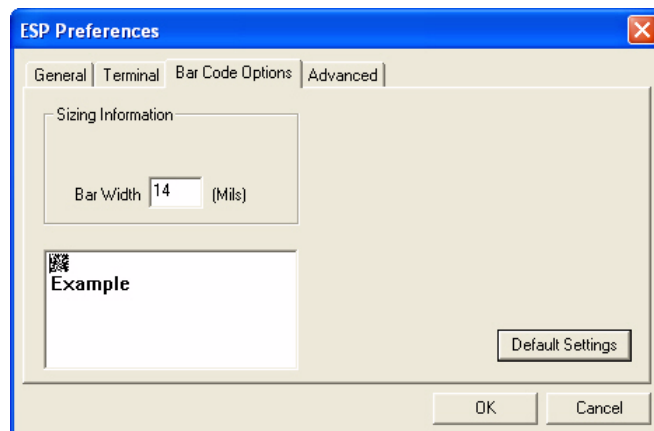
Sets up the sizing, font, and caption parameters for the bar codes that you can create and print from the **Bar Code Dialog** under **View**.

Sizing Information

Sets the bar height (in inches) and bar width (in thousands of an inch) of the symbols. A bar width of 13 is 0.013 inches.

Caption

Sets the characteristics of the caption font and its placement in relation to the symbol.

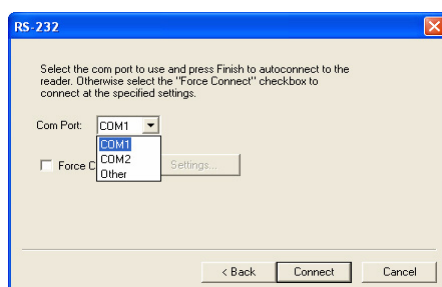


Connect

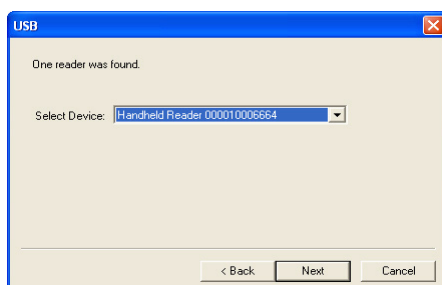
Connection Wizard

When you choose to connect to the Imager via the **Connection Wizard**, you will first need to select the correct protocol (see **"Select Protocol"** in Chapter 1, "Quick Start". If you are using RS-232, you must select the correct communications port.

1. Select the appropriate protocol (RS-232 or USB) and click **Next**.
2. **RS-232**: Select the communications port you are using and click **Connect**.



USB: Select the Imager model you are using and click **Next**.



3. When you have successfully connected to the Imager you will see one of the two following displays in the status bar at the lower right of the screen:

RS-232:	MS-Q-1	MS-Q	CONNECTED	Point-to-Point	COM1	57.6K
	MS-Q-1	MS-Q	CONNECTED			

Settings / Options

Settings allows you to set baud rate, parity, stop bits, data bits and communications port for the RS-232 interface before connecting.

Options allows you to autoconnect to the Imager (RS-232), follow standard connection

Pulldown Menus

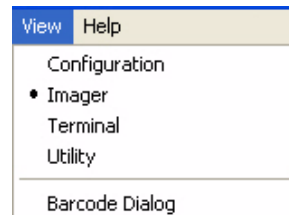
procedure (RS-232 and USB), and disconnect the Imager from **ESP** (RS-232 and USB).

View

The options in the **View** menu correspond to icons on the operations toolbar (**Configuration, Imager, Terminal, Utilities**). Each option allows you to configure the Imager or to perform various other functions in the chosen view.

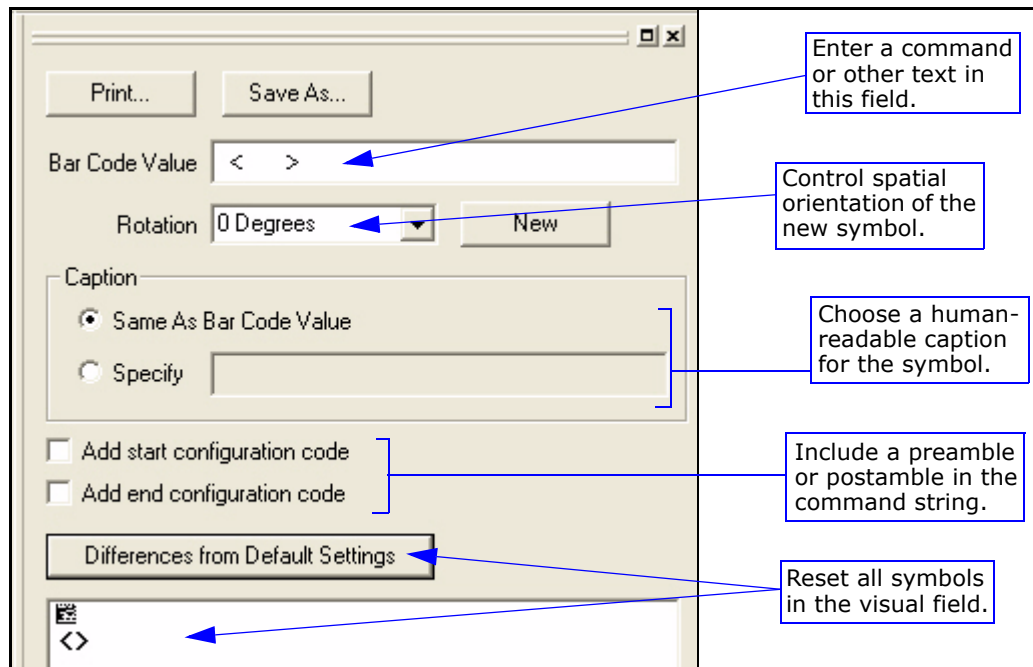
The **Imager, Terminal, and Utilities** views are explained fully in later chapters.

The **View** menu also allows you to access the **Barcode Dialog**.



Barcode Dialog

In the **Barcode Dialog** you can directly type the text and commands you want to encode. This allows you to create configuration symbols that you can print and read with the Imager.



Send/Receive

To access **Receive**, **Save**, **Default**, and **Advanced** options, click the **Send/Recv** button. You can also access these options by right-clicking in any of the configuration views.



Receive Reader Settings

From the **Send/Recv** menu, select **Receive Reader Settings**.

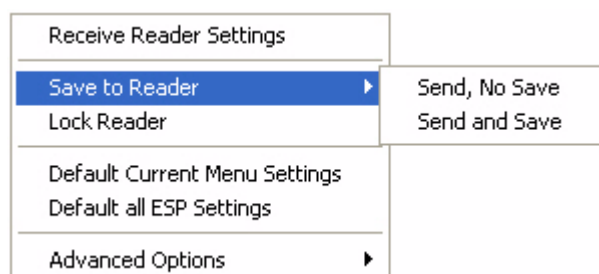
This option is useful if you want to receive the Imager's settings and save them as a file for later retrieval. For example, if your Imager has settings that you do not want to change, choosing **Receive Reader Settings** will allow you to load those settings to **ESP** and save them as an **ESP** file.

Receiving the Imager's settings also assures that you will not subsequently save any unwanted configuration changes previously made in **ESP**.



Do not select this option if you do not want to upload the Imager's settings to **ESP**. For example, if your **ESP** file has a number of custom settings that you want to maintain and download to the Imager, you will lose those **ESP** settings if you choose to receive settings from the Imager.

Save to Reader



Send, No Save

This saves **ESP** settings to current memory.

Send and Save

This activates all changes in current memory *and* saves to the Imager.

Default

When you select **Default Current Menu Settings** or **Default all ESP Settings** you are *only* defaulting settings in **ESP**. The Imager is not affected unless you download new settings.

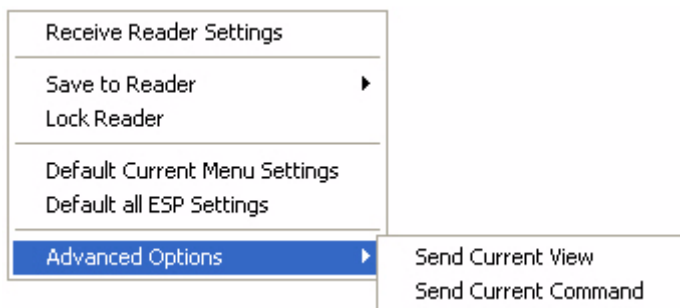
Advanced Options

Send Current View

This is the same as **Save to Reader > Send No Save** except that only the commands in the current menu tree are sent.

Send Current Command

This is the same as **Send Current View** above, but only saves the command that is currently selected.



This dropdown menu is only available in the **Configurations** view.



When sending commands to the Imager, consider sending multiple commands simultaneously rather than one at a time. This will increase your efficiency, as you will spend less time waiting for commands to load.

Chapter

3

Basic Operations

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Step 2 Determine Optimum Position.....	3-3
Step 3 Select Quadrus or Basic Mode.....	3-4
Step 4 Lock Settings on Test Symbol.....	3-5
Step 5 Complete Configuration.....	3-6
Performing a Hardware Default	3-7

This section explains how to begin using the MS-Q Imager, how to configure the Imager, how to perform a "hardware default," and how to switch between Quadrus and Basic modes.

(Mode switching is available for MS-Q Quadrus Imagers only.)



Practice Targeting

Step 1 — Practice Targeting



The laser beam can be harmful to eyesight. Avoid eye contact with the laser beam. Never point the beam at other people, or in a direction where people may be passing.



When first connecting, allow approximately 3 seconds for the MS-Q to initialize.

1. Hold the Imager steady and point at a bar code symbol between **2.75** and **4.5** inches (**70** to **114** mm) away (High Resolution Option) or between **4** inches and **9** inches (**102** to **229** mm) away (Standard Resolution Option).
2. Squeeze and hold the red trigger.
3. A red targeting spot will appear in front of the Imager surrounded by a flashing **RED** LED pattern.
4. Center the laser spot on the symbol and wait a second or two for a decode.



For configuration symbols, you will hear **2 beeps** when a good read occurs. For data symbols, you will hear **1 beep** when a good read occurs.

5. If no decode occurs, slowly draw away from the symbol while holding the spot steadily in place.

Read this Test Symbol:



ABCDEFGHIJKLMNPO

Tips for Reading

- Typically, you should not hold the Imager exactly perpendicular to the symbol. Position the Imager about 15 to 30 degrees to avoid specular reflection.
- Do not wave the Imager about or attempt to sweep across a symbol; sudden movements will create fuzzy images and result in failed read attempts.
- The Imager is omnidirectional and can read a symbol from any position (The exception to this is where you have enabled the read zone for certain linear symbols; in this case, the read area will be oriented to the length of the symbol.)

Step 2 — Determine Optimum Position

1. Position the Imager in front of the symbol.
 - High Resolution Option: 2.75" (70 mm) for **Near Field** or 4.5" (114 mm) for **Far Field**.
 - Standard Resolution Option: 4" (102 mm) for **Near Field** and 9" (229 mm) for **Far Field**.
2. Determine the optimum read position by triggering at different distances and angles.
3. To speed up decoding, try enabling **Near Field** or **Far Field** only. (By default, **Both Fields** are enabled.)



In general, if the symbol element size is less than 0.010" (0.025 mm), enable **Near Field** to a focal point. If more than 0.010" (0.025 mm), try the **Far Field** focal point. Also if symbols are placed closely together, you may want to use **Near Field** to lower the risk of reading the wrong symbol.

Other factors to consider:

- Use **Both Fields** for applications in which symbols may vary significantly in size and distance from Imager.
- On Quadrus models, try **Locked Mode** for even quicker decodes for symbols with consistent size and presentation (see "**Lock Settings on Test Symbol**" on page 3-5).
- For a more advanced setup, see "**Optimizing the Imager**" on page 9-10.

Read this Test Symbol:



ABCDEFGHIJKLMN

Program Handle Trigger for Near/Far/Both Fields

Both Fields (default)



M157_01

Near Field Only



M156_01

Far Field Only



M155_01

Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

Clear all Data



M052_01

Clear XML Rules

Step 3 — Select Quadrus or Basic Mode



This feature is available for MS-Q Quadrus Imagers only.

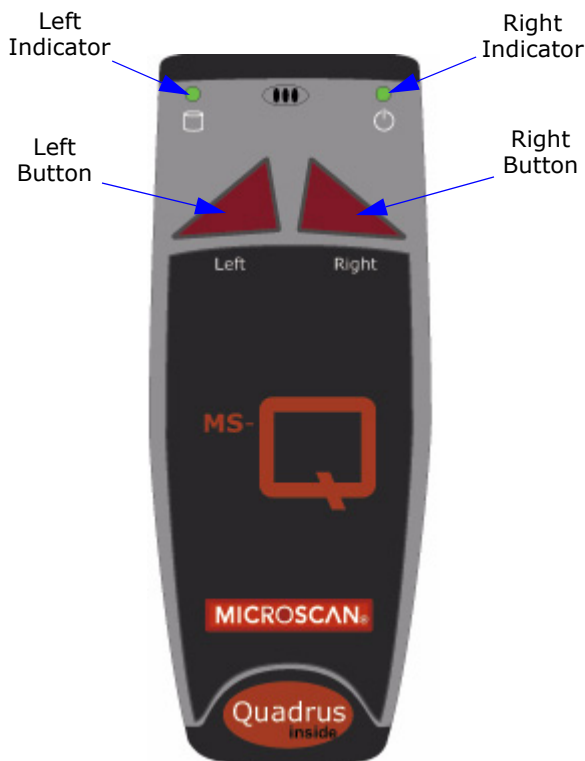


The firmware in the MS-Q Quadrus Imager allows you to toggle easily between the specialized Quadrus Mode that is preferred for DPM (Direct Part Marking) or the more generalized Basic Mode that includes all of the capabilities of the MS-Q Basic Imagers. The Quadrus Imager decodes Data Matrix code (both ECC 200 and ECC 0-140) and QR code. The Basic Imager decodes all symbologies, including Data Matrix (ECC 200 only) and QR code.

As with the MS-Q Basic Imager, in its default configuration, the MS-Q Quadrus Imager's right button and handle also initiate reads; however, the **left** button is used to toggle between Quadrus and Basic Modes.

When you press the **left** button while in Quadrus Mode, you will hear 3 beeps and see the left indicator LED flash **RED** 3 times. This indicates the Imager has switched to Basic Mode.

When you press the **left** button while in MS-Q Basic Mode you will again hear 3 beeps, but now the left indicator LED flashes **GREEN** 3 times. This indicates the Imager has returned to Quadrus Mode.¹



Reprogramming the **left** button disables mode shifting.

Read This Test Symbol:



ABCDEFGHIJKLMNOP

1. Compare with **"Change IP Mode"** on page 9-9.

Save changes whenever you reconfigure Imager settings.

Clear XML Rules



M052_01

Clear all Data



M071_01

Default to PS2



M060_01

Default to USB



M049_01

Save Settings



M188_02

Step 4 — Lock Settings on Test Symbol



This feature is available for MS-Q Quadrus Imagers only.



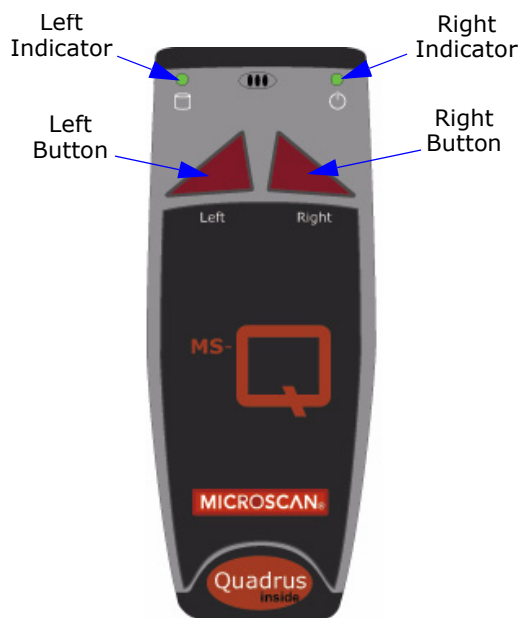
When you read symbols in the MS-Q Quadrus Imager default setup, the Imager is in the **Adaptive Mode**. In this mode when the Imager is activated from the handle trigger, it attempts to decode in both the **Near Field** and **Far Field** resolutions, checks for both standard or reverse images, and cycles through various gain values until a decode is achieved. It remains with those settings unless no decode occurs within ten attempts, in which case it resumes the adaptive routine.

If your application involves relatively similar symbols at consistent ranges, you might speed up decode rates by switching the Imager from **Adaptive Mode** to **Locked Mode**. When you switch to **Locked**, the optimum settings acquired in **Adaptive** will be locked in. This means that the Imager will not have to search through the various settings to arrive at the optimum. However, the settings will be fixed to the distance, symbol background, etc. that were in effect when the last decode occurred in the **Adaptive Mode**.

Toggling Between Adaptive and Locked

To toggle between the **Adaptive** and **Locked Modes**:

1. Find a position that gives you the best decodes. (See "**Determine Optimum Position**" on page 3-3.)
2. Press both the **left** and **right** top buttons at the same time and hold until you see both LED indicators (on top) flash **RED** twice. This indicates that you are now in **Locked Mode**.
3. To return to **Adaptive Mode**, press both buttons again until the indicators flash **GREEN** twice, indicating that you have returned to **Adaptive Mode**.



Read this Test Symbol:



ABCDEFGHIJKLMNP

Save changes whenever you reconfigure Imager settings.



Save Settings

M188_02



Default to USB

M049_01



Default to PS2

M060_01



Clear all Data

M071_01



Clear XML Rules

M052_01

Step 5 — Complete Configuration

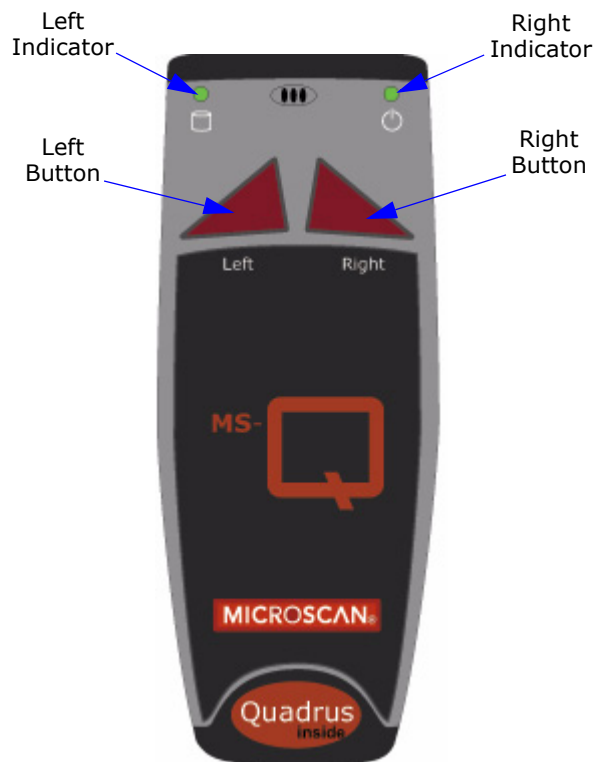
For the MS-Q Basic Imager, in the default configuration, both the **left** and **right** buttons as well as the handle trigger can initiate reads.

For the MS-Q Quadrus Imager, in the default configuration, the right button and handle also initiate reads; however, the **left** button is used to toggle between the Quadrus and Basic Modes.

Read this Test Symbol:



ABCDEFGHIJKLMNOP



Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Performing a Hardware Default

Occasionally it may become necessary to reset your Imager to its factory default configuration. If your Imager is locked or is failing to read, perform the following steps:

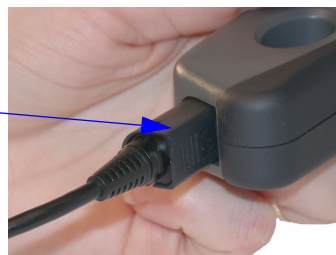
1. Remove the Imager from the handle attachment's cradle.



2. Disengage the USB or RS-232 cable from the bottom of the handle.



Do not pull directly on the cable; grasp and pull on the connector housing to release the locking mechanism and disengage.



3. Remove the battery or battery blank.

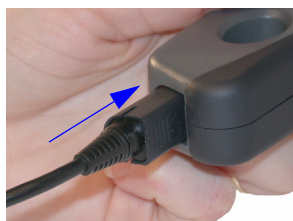
4. Press and hold down the **left** and **right** top buttons while reinserting and locking the battery or battery blank.



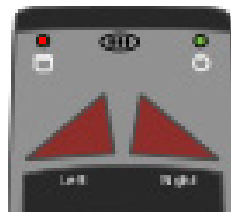
5. Reinsert the Imager in the handle attachment's cradle, aligning the cradle with the grooves along the sides of the Imager. Be sure that the handle's 8-pin mini-DIN connector inserts completely into the back of the Imager.

Performing a Hardware Default

6. Press and hold down the Imager's **left** and **right** top buttons while reinserting the cable into the bottom of the handle attachment.



7. When the cable is fully inserted, the Imager will beep five times. The left indicator LED will be **RED** and the right indicator LED will be **GREEN**.
8. Press and hold down both the **left** and **right** top buttons until the left indicator LED switches off.



For the default process to work correctly, you must release both buttons as soon as the left indicator LED switches off.

The Imager will then cycle through several different LED patterns and emit **two beeps**. This indicates that the Imager is in its default mode and is ready for use. Be sure that the Imager's memory is clear before you return to your desired settings. The following symbols will allow you to clear the Imager's memory of commands, settings, XML rules, and other data:



Clear XML Rules

M052_01



Clear Memory

M050_01

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Chapter

4

Communications

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This section includes connection parameters and options for communicating with various interfaces.

Communications by ESP

To make changes to configuration settings in the **Communications** menu tree:



Single click the **Communications** button to begin.

1. **Left click** on the + to expand the tree.
2. **Double click** on the parameter and click once in the selection box to view options.
3. Place your cursor in the selection box, scroll down to the setting you want to change and **click once** on the setting.

Parameters	ESP Values
[-] Communications	
+ Communications Mode	USB Keyboard
USB Keyboard Rate	10
[-] RS232	
Batch Mode	Assume Always Connect
Baud Rate	57.6K
Parity	None
Stop Bits	Two
Data Bits	Eight
Keyboard Mapping	US English*
Reader Auto Connect	US English*
Reconnect Timeout	ASCII - Universal
Reader Auto Disconnect	Custom
Max Connection Wait Time	30

4. **Left click** again on the open screen to complete the selection.
5. **Right click** on the open screen and select **Save to Reader** to implement the command in the reader.

Communications Overview

All MS-Q Handheld Imagers are shipped with a USB or PS2 cable. You can also add RS-232 and Bluetooth capabilities and configure your Imager accordingly. Whenever you default the Imager, it will return to USB or PS2 Keyboard Mode, depending on which interface you are using. Defaulting the Imager does not remove preamble and postamble formatting.

PS2

With PS2 communications, the MS-Q Imager connects directly into the host's keyboard port from which it draws its power. Data is displayed by any open Windows program that can capture text in PS2 Keyboard Mode.

USB

With USB communications, the MS-Q Imager connects directly into the host's USB port from which it draws its power. Data is displayed by any open Windows program that can capture text in USB Keyboard Mode.

USB Communication Indicator

	 Memory LED	 Battery LED^a	Sound
<i>Connection to Host Successful (USB)</i>	None	GREEN	1 Beep

a. When power is supplied via cable, the LED will remain green whenever the unit is active.

RS-232

With RS-232 communications the MS-Q Handheld Imager communicates with the host through a communications program such as HyperTerminal.

Default settings for establishing RS-232 communications are:

Baud = **57.6K**
 Parity = **None**
 Stop Bits = **One**
 Data Bits = **Eight**
 Flow Control = **None**

Bluetooth

Bluetooth connectivity is addressed in Chapter 5, "**Bluetooth**".

PS2 Interface

PS2 Keyboard is the default interface in which data is transferred to a Windows text program as keyboard data. *This interface requires a PS2 Imager model.* See "[PS2 Interface](#)" on page 1-4 for detailed steps on setting up the PS2 interface.

PS2 Keyboard



M126_01

Data is entered as keyboard sequences. Read this symbol whenever you are changing from a different interface to PS2.



The MS-Q Handheld Imager *must* be connected to the keyboard for the Imager and the keyboard to function in PS2 Mode.

USB Interface

USB Keyboard is the default interface in which data is transferred to a Windows text program as keyboard data. *This interface requires a USB or RS-232 Imager model.* See "[USB Interface](#)" on page 1-3 for detailed steps on setting up the USB Interface.

USB Keyboard



M134_01

Data is entered as keyboard sequences. You need to read this symbol whenever you are changing from a different interface to USB.

USB Downloader



M133_01

This mode is the standard way of transferring unformatted, unpackitized data to the Imager through the USB port.

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

RS-232 Interface



Enabling either of these modes will disable USB or PS2 communications and require you to default the Imager or read the **"USB Keyboard"** symbol (page 4-4) to return to USB.

See **"RS-232 Interface"** on page 1-5 for detailed steps on setting up the RS-232 Interface.

RS-232 Mode



M131_01

This mode is the standard way of transferring unformatted, unpackitized data through the RS-232 port.

You will need to read this symbol whenever you set up for RS-232 communications.

Baud Rate (RS-232)

Definition: The rate at which the Imager and host transfer data back and forth.

Usage: Only changed if necessary to match host setting.



M092_01

1200



M096_01

19.2K



M093_01

2400



M097_01

38.4K



M094_01

4800



M098_01

57.6K (Default)



M095_01

9600



M099_01

115.2K

Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

Clear all Data



M052_01

Clear XML Rules

RS-232 Interface

Parity (RS-232)

Definition: An error detection routine in which one data bit in each character is set to 1 or 0 so that the total number of 1 bits in the data field is even or odd.

Usage: Only changed if necessary to match host setting.



M103_01

None (Default)



M104_01

Odd



M102_01

Even

Stop Bits (RS-232)

Definition: One or two bits added to the end of each character to indicate the end of the character.

Usage: Only changed if necessary to match host setting.



M105_01

1 Stop Bit (Default)



M106_01

2 Stop Bits

Data Bits (RS-232)

Definition: Number of bits in each character.

Usage: Only changed if necessary to match host setting.



M101_01

Eight Data Bits
(Default)



M100_01

Seven Data Bits

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Preamble

Definition: Defines a character or characters that will be added to the front of the decoded data.



Characters will appear in the order that they are read in (from left to right). A double read will result in two of the same characters or actions.



There is no limit to the number of preamble and postamble characters except the total memory size.



If you read the symbols below, you might lose your current settings. Be sure to save your current settings before reading the following:

Steps for enabling a preamble:

1. Save current settings by reading **Save Settings** symbol at the bottom of the page.
2. Read the desired preamble character from the options presented here.

In some cases you may want to erase the current preamble characters. To do so, read the following symbol:

Clear XML Rules



If you are in Serial Mode (RS-232 or Bluetooth), erasing preamble and postamble characters will require you to re-configure the interface.

All Interfaces

Comma



M159_02

Space



M164_02

USB/PS2 Only

Tab



M166_01

RS-232 or Bluetooth Modem

Tab



M218_02

CR/LF



M214_02

Example of a Preamble:

Enable first the Comma then the Space symbols above and they appear before the data as follows: **, data**

Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

Clear all Data



M052_01

Clear XML Rules

Postamble

Definition: Defines a character or characters that can be added to the end of the decoded data.



Characters will appear in the order that they are read in (from left to right). A double read will result in two of the same characters or actions.



If you read the symbols below, you might lose your current settings. Be sure to save your current settings before reading the following:

Steps for enabling a postamble:

1. Save current settings by reading the **Save Settings** symbol at the bottom of the page.
2. Read the desired postamble character from the options presented here.

In some cases you may want to first erase the current postamble characters. To do so, read the following symbol:

Clear XML Rules



M052_01



If you are in Serial Mode (RS-232 or Bluetooth), erasing postamble and postamble characters will require you to re-configure the interface.

All Interfaces

Comma



M160_02

Space



M165_02

USB/PS2 Only

Tab



M167_02

CR



M168_01

RS-232 and Bluetooth Only

Tab



M219_02

CR/LF



M170_02

LF



M169_02

Example of a Postamble:

Enable a Space, then a Comma. The result will be: **data ,**

Save changes whenever you reconfigure Imager settings.

Clear XML Rules



M052_01

Clear all Data



M071_01

Default to PS2



M060_01

Default to USB



M049_01

Save Settings



M188_02

Preamble and Postamble by ESP

Characters and commands can also be added to the beginning and end of data strings using **ESP**. There are a few different ways to do this, using the matrix to the right of the **Communications** tree control.

Enter preamble text in this field.

Enter postamble text in this field.

Save pre- and postamble settings, or send them directly to the reader.

Or, choose from a field of frequently used commands. Set your preamble or postamble with one click.

Scroll through a list of all preamble and postamble options, and then just insert.

Preamble:

Postamble:

☒ Preamble ☐ Postamble

? - %3f - ASCII question mark

Insert

Alt Ctrl Shift Windows

Home End Enter Escape

Page Up Backspace

Page Down Up

Left Down Right

Carriage Return (CR) % - Percent Sign Esc 500 ms Delay

Tab - Keystroke/USB Tab - Ascii/RS232 / - Forward Slash Esc

Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

Clear all Data



M052_01

Clear XML Rules

Keyboard Mapping

Definition: Data is mapped according to US keyboard or ASCII.

Usage: Provides alternatives for keyboards that do not conform to US keyboard mapping.



This is not to be confused with USB Keyboard Mode which has an entirely different function, namely to enable USB cabled communications. (See **"USB Interface"** on page 1-3).

US Keyboard Mapping



M172_01

Data is mapped as if it were typed on a US keyboard. This is quicker than Universal which uses the larger ASCII reference to map data.

Universal Keyboard Mapping



M173_01

Data is mapped by reference to ASCII characters. This is a slightly slower process, but allows any language and keyboard layout to be mapped.

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Time Stamp Settings

The MS-Q has a time stamp feature that when enabled inserts the time in front of each read in the form of an 8-digit preamble representing days, hours, minutes, and seconds in the following format: ddhhmmss (day day/ hour hour/minute minute/seconds seconds).

The time stamp is in relative time and starts over whenever the Imager is powered-on.

Time Stamp On



Time Stamp Off (Default)



Example:

01014627:ABCDEFGHIJKLMN

Day is: 01

Hour is: 01

Minutes are: 46

Seconds are: 27

Data is: ABCDEFGHIJKLMN



If you want to set a specific time stamp value to be your preamble (see symbols M333_01 to M380_01 in **"Configuration Symbols"**) you must first enable time stamp settings.

Time Stamp Settings

Chapter **5**

Bluetooth

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Bluetooth Access	5-5
Sleep Mode Timeout	5-6
Bluetooth Modem Kit	5-7

This section includes connection parameters and options for communicating by the Bluetooth RF standard. Bluetooth is not supported by ESP.

Bluetooth Overview

This Bluetooth version of the MS-Q includes an internal Bluetooth® wireless radio. The radio allows for point to point wireless communication with other Bluetooth devices that support serial port protocol (SPP).

For quick setup information for connecting your Bluetooth Imager with the Microscan Bluetooth modem, see "[Bluetooth Interface](#)" on page 1-6.

Once a MS-Q is connected, the application software on the host must be open to receive data with a communications program such as HyperTerminal.

Terminal Default Settings

Baud = **9600**
Parity = **None**
Stop Bits = **One**
Data Bits = **Eight**
Flow Control = **None**

Specifications

The MS-Q Bluetooth radio is a Class 1 device. If connected to another Class 1 device the MS-Q has roughly 100 meters (328 feet) line of sight operating range. If connecting to a Class 2 or Class 3 device, the operating range may drop to match the lower range.

Operation

When the MS-Q detects the radio is out of range, the MS-Q will store data on the Imager's non-volatile memory. The Imager will continue to try and send data until radio is back in range. Once the data is sent, the data will be erased from the units memory unless the Batch Mode is set for **Send & Log**. If the radio cannot connect in 90 seconds, it will emit an error beep. The Imager will continue to try to connect until it has reached the programmable radio timeout setting.

If the MS-Q Imager is saved in Bluetooth **RF Two-Way Mode** and **Autoconnect** is enabled (as it is by default), it will automatically attempt to reconnect with the host modem whenever:

1. The Imager is powered-on.
2. The Imager attempts to read another symbol.

Another consideration is access. You choose **Private** when you want to limit access to only one Imager. You choose **Shared** when you want more than one Imager to have continuous access.

Connecting to the MS-Q Bluetooth Modem

Two-Way Communication

This is the mode used when communicating with the MS-Q Bluetooth modem. It is used when there is a need for bidirectional communication between the MS-Q and an application by radio frequency (i.e. Time Stamp, Error Checking, **Shared Access**, etc.). The Imager receives confirmation via packet protocol verification and is 100% reliable.

To connect with the Bluetooth modem:

1. Read the **RF Two-Way Mode** symbol.
2. Read the Quick Connect Symbol on the **TOP** of your connected Bluetooth modem to establish communications.
3. Read the **Save Settings** symbol at the bottom of this page.



(See **"Bluetooth Interface"** on page 1-6 for setup details.)

Table 5-1 Bluetooth Communication Indicators

Bluetooth Activity	 Memory LED	 Battery LED	Sound
Attempting to Connect	Multiple BLUE Flashes	None	None
Connection to Host Successful	None	Flash RED 1 time	1 Beep
Connection to Host Failed	Flash RED 4 times	Flash RED 4 times	4 Beeps

Disconnect

You may force disconnection by reading the disconnect symbol (in a Master/Secondary Bluetooth connection, the MS-Q may not appear disconnected for 10 to 15 seconds after the command is issued). The MS-Q will also disconnect (go into Sleep Mode) after a period of inactivity (as set in **"Sleep Mode Timeout"** on page 5-6).



Autoconnect

After coming out of Sleep Mode or after powering-on, the Imager tries to autoconnect with the last host modem it had been connected with.

If **Autoconnect** is enabled, the Imager will connect to the host whenever it has data and the Imager is idle (but not asleep).

Autoconnect (default)



This allows connected Imagers to send data whenever it is read.

Disable Autoconnect



An Imager that reads this symbol will not connect to the modem until re-programmed to do so (see **"Bluetooth Interface"** on page 1-6.)

Save changes whenever you reconfigure Imager settings.



Save
Settings



Default
to USB



Default
to PS2



Clear
all Data



Clear XML
Rules

Connecting to the MS-Q Bluetooth Modem

One-Way Mode



One-Way Mode is not supported by the Microscan Bluetooth modem. **One-Way Mode** is supported by most other Bluetooth modems (e.g. Belkin).



While robust, One-Way modes do not receive packet verification. Therefore data integrity cannot be guaranteed and some data could be lost.

One-Way Mode is only recommended when connecting to a device well within the Imager's specified range or if connected to a device without an operating system (e.g. printer).

One-Way

Maximum
Range



M127_01

This mode is the standard way of transferring unformatted, unpackitized data by radio frequency. **The Maximum Range** setting optimizes the MS-Q for greater range but data reliability is lower.

One-Way

Maximum
Reliability



M128_01

The **Maximum Reliability** setting optimizes the MS-Q for greater reliability but the radio range is lower.



Always read the **Save Settings** symbol after changing options.

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Bluetooth Access

In the default access mode (**Private Access**) only one Imager can access the modem, provided that the Imager remains active.

However, more than one Bluetooth Imager can connect and automatically transmit to a single host modem, provided that each Imager has been setup for communication with a Bluetooth modem and **Shared Access** is enabled for each.

Private Access

Private (default)



M065_01

When **Private Access** is enabled (default), only one *active* and connected Bluetooth Imager will be able to send data. An Imager remains active if it is connected and has not reached the timeout period set in **Sleep Mode Timeout**. If it enters Sleep Mode, any other Imager enabled for **Private Access** can become active and maintain exclusive access as long as it remains active itself.

Shared Access

Shared Access



M066_01

When **Shared Access** is enabled, an Imager will disconnect from the host after a successful send and re-connect only when it has new data to send and the host port is available. In this mode any Imager can send data, but since an Imager must identify itself each time it connects, a few seconds of latency will necessarily occur before each transmission. This however does not prevent the Imager from reading and decoding while awaiting access.



All Imagers must have **Shared Access** enabled before the mode can function in any of the Imagers individually.



Shared Access is recommended only when **RF Two-Way Mode** is enabled.

Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

Clear all Data



M052_01

Clear XML Rules

Sleep Mode Timeout

Sleep Mode Timeout

Following a period of inactivity, the Imager will go into Sleep Mode, during which it will no longer signal its presence to the modem. It leaves Sleep Mode whenever the Imager is powered-on or a read is attempted.

Read the symbols below to set the period of time before Bluetooth will enter Sleep Mode from inactivity.



When coming out of Sleep Mode, you can anticipate about 5 seconds of connect time before a symbol can be read and transmitted.



Increasing the Bluetooth radio timeout duration will decrease battery life.

90 Seconds (default)



M125_01

15 Minutes



M123_01

1 Hours



M119_01

5 Minutes



M121_01

30 Minutes



M124_01

2 Hours



M120_01

10 Minutes



M122_01

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings

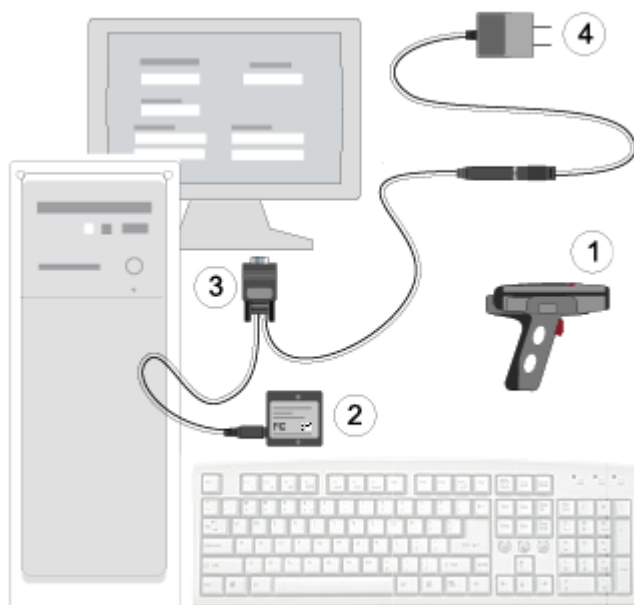


M188_02

Bluetooth Modem Kit

Part Number: 98-000076-XX. See **"Bluetooth Interface"** on page 1-6 for more details.

Bluetooth Modem Kit



1. MS-Q Handheld Imager with battery (FIS-6100-0006 or FIS-6150-0003)
2. Microscan Bluetooth modem
3. RS-232 cable
4. Power supply

For information about how to connect to **ESP** with Bluetooth, see Chapter 11, **"Utilities"**.

Chapter **6**

Batch/Battery

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This section includes connection parameters and options for communicating in Batch/Battery interface.

Battery

Installation

See **"Batch/Battery Interface"** on page 1-7 for instructions on installing the battery.

Charging the Lithium Ion Battery

The battery automatically charges every time a cable interface is attached to the MS-Q and the host is powered-on.



The RS-232 interface power adapter must be plugged into a wall socket for the battery to charge.¹

In USB and PS2 interfaces, the MS-Q and battery draw their current from the host computer.

Typical Battery Charge Time:

USB and PS2	RS-232	Battery Charger
6 to 8 hours	6 to 8 hours	4 hours

See **"USB Battery Charge Mode"** on page 6-7 for information about recharging the battery by use of a USB connection.

Typical Battery Usage when not connected to the host:

- 8 hours Standby
- 4000 Scans

See **"Performing a Manual Battery Recharge"** on page 6-6 for instructions on recovering from complete loss of battery charge.

Batch Mode Indicators

	 Memory LED	 Battery LED^a	Sound
<i>Decode and Store</i>	Flash AMBER or RED	Flash GREEN , AMBER or RED	1 Beep
<i>Batch Memory Full</i>	Flash RED	Flash GREEN , AMBER or RED	3 Beeps

a. When power is supplied via cable, the LED will remain green whenever the MS-Q is active.

(See **"MS-Q Indicators"** on page 8-5 for additional LED information.)

After a successful decode in Batch Mode, the MS-Q will beep once and the memory LED will flash either red or amber depending on memory level. Also every 15 seconds the battery LED will flash green, amber or red depending on the battery level. This is true whether an Imager is cabled or uncabled.

1. Also consider Microscan's 2-Bay Battery Charger, P/N 98-000075-xx.

Batch Mode Options

The MS-Q unit features a Batch Mode for applications requiring a portable Imager. Batch Mode allows a user to store scanned data to the Imager's non-volatile memory and later transfer that data to a host computer when connected, either by USB and RS-232 cable or by Bluetooth.

The MS-Q dedicated batch memory is a minimum of 1MB.

The MS-Q will automatically detect when the Bluetooth® radio is out of range, a USB or PS2 cable is detached, or an RS-232 cable is detached (provided it is plugged into a power supply). If a battery is installed, the MS-Q will switch to Batch Mode and buffer the data in non-volatile memory.

Send & Log



If you read the **Send & Log Mode** symbol to the left, whenever you connect, all data in the buffer will be downloaded to the host but retained in the Imager's memory. The data can be transferred again by scanning **Transfer All Data in Memory**.



When the memory LED turns **RED**, you *must* download or data will be lost.

Send & Buffer (Default)

If you read the **Send & Buffer Mode** symbol to the right, whenever you connect, all data in the buffer will be downloaded to the host and **ERASED** in the MS-Q.



You must have a data collection program open before connecting in this mode *or all buffered data will be lost*.

Log Only



In **Log Only Mode**, the Imager will only store data into non-volatile memory. You can only send the data by scanning **Transfer All Data in Memory** (see explanation next page). Once the memory has been transferred to a host, all of the data will still reside in memory. A user must read the **Delete Scanned Data from Memory** symbol to clear memory.

Save changes whenever you reconfigure Imager settings.



Save Settings



Default to USB



Default to PS2



Clear all Data



Clear XML Rules

Reconnecting to the Host

When reconnected to the host, or when the Bluetooth Radio is back in range, the Imager will automatically detect the connection and, depending on the Batch Mode, transfer or log (retain) buffered data.

The Imager is considered connected if:

- It is in **RF Two-Way Mode** and the Bluetooth radio is in range and active.
- It is in **PS2 Keyboard Mode** and a PS2 cable is connecting the Imager to a host via the keyboard.
- It is in **USB Keyboard Mode** and a USB cable is connecting the Imager to a host.
- It is in **RS-232 Mode** and the cable is attached to a host with power supply plugged in.

Transfer Options



M077_02

Transfer All Data in Memory

This will send all data in memory every time the symbol is read.



M078_02

Transfer only Unsent Data

This symbol will send only the data in memory that hasn't already been sent when the symbol is scanned. **Note:** This ONLY works in **Send & Log Mode**.



M071_01

Delete Scanned Data from Memory

Scanning this symbol will erase all data in the Imager's non-volatile memory.

Auto Transfer Options

In addition to the above options, you can program the MS-Q to transfer buffered memory automatically or not whenever a connection to a host is established.



M070_01

Enable Auto Transfer (Default)



M069_01

Disable Auto Transfer



Typically this setting is set to **Enable** and the choice of sending or not sending is made in **Send & Log**, **Send & Buffer**, and **Log Only** options.

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

RS-232 Batch Features

RS-232 interfaces WILL NOT detect when an RS-232 cable is removed unless the power adapter for the RS-232 cable is plugged in. If your power cable is unplugged, you may still enter **Batch Mode** by scanning the **RS-232 Batch** symbol below.

However, when you return and re-connect to the RS-232 adapter you must enable **RS-232 Cabled** to put the Imager back into **Cabled Mode**. In **RS-232 Cabled** the Imager thinks it is always connected. It has no way to know (or check) if it is unplugged. Therefore, data collected will be automatically sent out the disconnected port, (i.e. it will not buffer the data -- it will only log it, assuming **Send & Log Mode** is set). The data would be lost if the Imager were in **Send & Buffer Mode**.

RS-232 Batch



M073_01

RS-232 Cabled



M074_01

The opposite is true for **RS-232 Batch**. In this mode the Imager assumes that it is NOT cabled. It will buffer and log the data unless you plug it into the cable that has a power adapter. In this exception the Imager can detect the power line and automatically switch to "cabled operation".

Save changes whenever you reconfigure Imager settings.



M188_02

Save
Settings

M049_01

Default
to USB

M060_01

Default
to PS2

M071_01

Clear
all Data

M052_01

Clear XML
Rules

Performing a Manual Battery Recharge

If the MS-Q's lithium ion battery is allowed to lose 100% of its charge, the Imager will become locked in a continual vibration cycle. The mechanism of vibration is the same as the "successful decode" indicator, which can be switched between **beep** and **vibrate**. However, when the Imager vibrates to indicate total loss of battery charge, it is unable to decode symbol data and it cannot be defaulted.

To recover from this vibration cycle, it is necessary to follow these steps in order to "jump-start" the Imager and provide enough charge to perform a default:

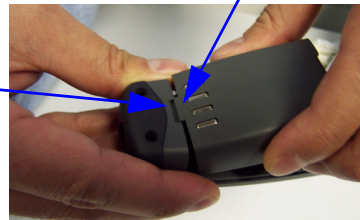
1. Remove the battery.



2. Align the battery with its housing *on the side opposite the sliding latch mechanism*.



Hold the battery at an angle from its housing, balanced where the battery's tab is aligned with the housing's slot.



3. Starting from the angled position described in step 2, lower the battery completely into its housing **three times**, but *do not engage the sliding latch mechanism until the third time the battery is inserted*.



The battery should be inserted for slightly less than one second each time it is lowered. Maintain a steady rhythm while performing this sequence.

4. The third and final time the battery is lowered and inserted, leave it in its housing and move the sliding latch mechanism into its locked position.
5. Default the Imager.



For best results, charge the battery fully before you next use the Imager.

USB Battery Charge Mode

If you choose to charge the MS-Q Handheld Imager's battery with a USB connection, you have the option of using **USB Battery Charge Mode**. This mode dedicates most of the power available from the USB connection to charging the battery. Read the symbol below to enable **USB Battery Charge Mode**.



CC000227_01

***Enable USB Battery
Charge Mode***



CC000228_01

***Default to Previous
Settings (Disable USB
Battery Charge Mode)***

The Imager is able to read and decode symbol data while in **USB Battery Charge Mode**. After each symbol read the Imager automatically returns to its battery charging state.

USB Battery Charge Mode

Chapter

7

Symbologies

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This section describes the various symbol types that can be read and decoded by the Imager.

See <http://www.aimglobal.org/standards/aimpubs.asp> for additional information about symbologies.

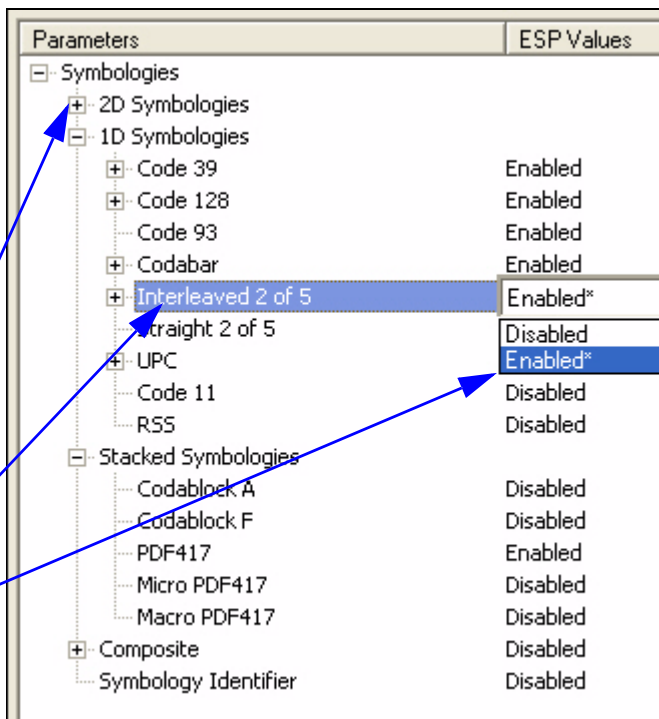
Symbologies by ESP

To make changes to configuration settings in the **Symbologies** menu tree:



Single click the **Symbologies** button to begin.

1. **Left click** on the + to expand the tree.
2. **Double click** on the parameter and click once in the selection box to view options.
3. Place your cursor in the selection box, scroll down to the setting you want to change and **click once** on the setting.



4. **Left click** again on the open screen to complete the selection.
5. **Right click** on the open screen and select **Save to Reader** to implement the command in the reader.

Symbol Background

(Background color)

Definition: Allows the Imager to ignore reverse backgrounds (light-on-dark) and restrict its efforts to decoding dark-on-light backgrounds.

Usage: **Reverse Background Off** will speed up the processing if only dark-on-light background symbols are being read.

Reverse Background On (default)



In the default state, **Reverse Background On** means that both types of symbols, dark-on-light and light-on-dark backgrounds will be read.

Reverse Background Off



When enabled, processing is quicker but only dark-on-light background symbols can be read.

Sample Data Matrix Symbol



Microscan

Sample Data Matrix Symbol (Dark Background)



Microscan



Available for **Quadrus** and **Basic** Modes.

Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

Clear all Data



M052_01

Clear XML Rules

Aztec

Aztec

Read the following symbols to enable/disable **Aztec** symbology settings:

Aztec On



Aztec Off (default)



Sample Aztec Symbol



Microscan



Available for **Basic** Mode only.

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Codabar

Read the following symbols to enable/disable **Codabar** symbology settings:

Codabar On



M275_01

Codabar Off (default)



M274_01

Sample Codabar Symbol



A12345A



Available for **Basic** Mode only.

Save changes whenever you reconfigure Imager settings.



M188_02

Save
Settings



M049_01

Default
to USB



M060_01

Default
to PS2



M071_01

Clear
all Data



M052_01

Clear XML
Rules

Codablock F

Codablock F

Read the following symbols to enable/disable **Codablock F** symbology settings:

Codablock F On



M277_01

Codablock F Off (default)



M276_01



When Codablock F and Code 128 decoding are enabled, there is some risks of mistakenly decoding a damaged Codablock F symbol as a Code 128 symbol. Therefore, whenever possible, Code 128 decoding should be disabled when Codablock F decoding is enabled.

Sample Codablock F Symbol



Microscan



Available for **Basic** Mode only.

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Code 128

Read the following symbols to enable/disable **Code 128** symbology settings:

Code 128 On (default)



M283_01

Code 128 Off



M282_01

Code 128 Narrow Margins On



M392_01

Code 128 Narrow Margins Off



M391_01

Sample Code 128 Symbol



1234



Available for **Basic** Mode only.

Save changes whenever you reconfigure Imager settings.



M188_02

Save
Settings



M049_01

Default
to USB



M060_01

Default
to PS2



M071_01

Clear
all Data



M052_01

Clear XML
Rules

Code 93

Code 93

Read the following symbols to enable/disable **Code 93** symbology settings:

Code 93 On (default)



M281_02

Code 93 Off



M280_01

Sample Code 93 Symbol



1234



Available for **Basic** Mode only.

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Code 39

Read the following symbols to enable/disable **Code 39** symbology settings:

Code 39 On (default)



M235_01

Code 39 Off



M234_01

Enable Checksum



M237_01

Disable Checksum (default)



M236_01

Enable Checksum and strip from result



M238_01

Code 39 Extended Full ASCII On



M233_01

Code 39 Extended Full ASCII Off (default)



M232_01

Code 39 Narrow Margins On



M390_01

Code 39 Narrow Margins Off



M389_01

Sample Code 39 Symbol



12345F



Available for **Basic** Mode only.

Composite

Composite

To read **Composite** Symbols,

1. First enable the corresponding linear code component.
2. Read the **Composite On** symbol below.

Composite On



M285_01

Composite Off (default)



M284_01

Sample Composite Symbol

(Linear component is RSS 14)



0198765432109879Microscan



Both the linear symbology and Composite must be enabled before the Imager can decode a Composite symbol correctly.



Available for **Basic** Mode only.

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Data Matrix

Read the following symbols to enable/disable **Data Matrix** symbology settings:

Data Matrix Rectangle On (default)



M242_01

Data Matrix Rectangle Off



M241_01

Data Matrix Inverse On (default)



M239_01

Data Matrix Inverse Off



M240_01

Sample Data Matrix Symbol



Microscan

Sample Data Matrix Symbol with Inverse On



Microscan



Data Matrix Rectangle and Inverse available for **Quadrus** and **Basic** Modes.

Data Matrix ECC 0-140 On



Q005_01

Data Matrix ECC 0-140 Off (default)



Q006_01



Data Matrix ECC 0-140 available for **Quadrus** Mode only.



GoCode

GoCode

Read the following symbols to enable/disable **GoCode** symbology settings:

GoCode On



M279_01

GoCode Off (default)



M278_01

Sample GoCode Symbol



1234567890



Available for **Basic** Mode only.

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Interleaved 2 of 5

Read the following symbols to enable/disable **Interleaved 2 of 5** symbology settings:

I-2/5 On (default)



M244_01

I-2/5 Off



M243_01

I-2/5 Two Digits On



M246_01

I-2/5 Two Digits Off



M245_02

I-2/5 Four Digits On (default)



M248_01

I-2/5 Four Digits Off



M247_01

Sample Interleaved 2 of 5 Symbol



012348



Available for **Basic** Mode only.

Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

Clear all Data



M052_01

Clear XML Rules

Maxicode

Maxicode

Read the following symbols to enable/disable **Maxicode** symbology settings:

Maxicode On



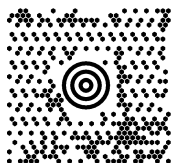
M289_03

Maxicode Off (default)



M288_01

Sample Maxicode Symbol



840003 Microscan



Available for **Basic** Mode only.

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

MSI Plessy

Read the following symbols to enable/disable **MSI Plessy** symbology settings:

MSI Plessy On



M291_01

MSI Plessy Off (default)



M290_01

Sample MSI Plessy Symbol



12344



Available for **Basic** Mode only.

Save changes whenever you reconfigure Imager settings.



M188_02

Save
Settings



M049_01

Default
to USB



M060_01

Default
to PS2



M071_01

Clear
all Data



M052_01

Clear XML
Rules

PDF417

Read the following symbols to enable/disable **PDF417** symbology settings:

PDF417 On (default)



M293_01

PDF417 Off



M292_01

Macro PDF417 On



M287_01

Macro PDF417 Off (default)



M286_01

If your data is encoded into multiple PDF417 symbols, the Macro PDF417 feature allows a user to read these PDF417 symbols and combine the information. The Macro PDF417 function has the following limitations:

1. You can read non-Macro PDF417 symbols in the middle of a Macro PDF417 file. They will be uploaded immediately. The incomplete Macro PDF417 segments will be buffered.
2. Scanning a Macro PDF417 symbol with a file ID different than the Macro PDF417 segments already stored will cause the stored segments being deleted (aborted) and you will hear beeps. The new file starts with this symbol.
3. The MS-Q only supports up to 16 file segments. When the buffered segments reach 16 and the file is still not complete, you will hear 3 beeps and all the buffered segments will be deleted.
4. You cannot read a segment of the same file more than once.

Sample PDF417 Symbol



Microscan



Available for **Basic** Mode only.

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Micro PDF417

Read the following symbols to enable/disable **Micro PDF417** symbology settings:

Micro PDF417 On



M301_01

Micro PDF417 Off (default)



M300_01

Sample Micro PDF417 Symbol



Microscan



Available for **Basic** Mode only.

Save changes whenever you reconfigure Imager settings.



M188_02

Save
Settings



M049_01

Default
to USB



M060_01

Default
to PS2



M071_01

Clear
all Data



M052_01

Clear XML
Rules

Postal Symbologies

Read the following symbols to enable/disable **Postal** symbology settings:

Japan Post On



M253_01

Royal Mail On



M258_01

Australian Post On



M252_01

Disable All Postal Symbologies (default)



M259_01

KIX On



M254_01

Planet On



M256_01

Postnet On



M257_01

Postnet and Planet On



M255_01



Available for **Basic** Mode only.

QR Code

Read the following symbols to enable/disable **QR Code** symbology settings:

QR Code On



M261_01

QR Code Off (default)



M260_01

Enable Checksum



M265_01

Disable Checksum (default)



M264_01

QR Code Inverse On



M262_01

Both QR Code Inverse and Standard On



M263_01

Sample QR Code Symbol



Microscan



Available for **Quadrus** and **Basic** Modes.

Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

Clear all Data



M052_01

Clear XML Rules

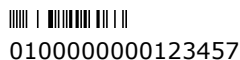
RSS Symbolologies

Read the following symbols to enable/disable **RSS** symbology settings:

RSS Limited On



Sample RSS Limited



RSS 14 and RSS 14 Truncated On



Sample RSS 14 Truncated



RSS 14 Stacked On



Sample RSS 14 Stacked



RSS Expanded On



Sample RSS Expanded



All RSS On



Sample RSS 14



All RSS Off (default)



Available for **Basic** Mode only.

UPC/EAN/JAN

Read the following symbols to enable/disable **UPC/EAN/JAN** symbology settings:

UPC/EAN/JAN On (default)



M295_01

UPC/EAN/JAN Off



M294_01

UPC/EAN/JAN Narrow Margin On



M299_01

UPC/EAN/JAN Narrow Margin Off (default)



M298_01

UPC/EAN/JAN Extensions On



M297_01

UPC/EAN/JAN Extensions Off (default)



M296_01



Unless necessary, enabling **Narrow Margin** is not recommended.

Sample UPC/EAN/JAN Symbol



Available for **Basic** Mode only.

Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

Clear all Data



M052_01

Clear XML Rules

UPC/EAN/JAN

Chapter

8

I/O Parameters

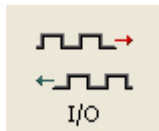
Chapter Contents

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This section contains information on how to set your Imager to the most efficient and effective parameters for your application.

I/O Parameters by ESP

To make changes to configuration settings in the **I/O Parameters** menu tree:



Single click the **I/O Parameters** button to begin.

1. **Left click** on the + to expand the tree.

2. **Double click** on the parameter and click once in the selection box to view options.

3. Place your cursor in the selection box, scroll down to the setting you want to change and **click once** on the setting.

Parameters	ESP Values
☒ I/O Parameters	
Noread Notification	Disabled
+ Laser Target	Enabled
IR Illumination Control	Control Red and IR
+ Button Programming	
+ Button Confirmation Time	
☒ Beeper	
Volume	0
Duration	72
Separation	100
Vibrate	Enabled
+ Time before Power-Saving Idle	Disabled*
Time before power-Saving Sleep	Enabled
Time before Sleep when Cabled	7200
AGC Frame Adjust Count	0
AGC Selection	Use Decoder AGC
Minimum Illumination	30
Maximum Illumination	100
Auto Store Data Erase	Enabled
Auto Transfer	Enabled
Storage Mode	Send and Buffer

4. **Left click** again on the open screen to complete the selection.

5. **Right click** on the open screen and select **Save to Reader** to implement the command in the reader.

Laser Target Spot

In most applications the laser target spot will have no effect on readability and the question of on/off or brightness of the spot is only a matter of user preference.

Turn Target Spot Off



M054_01

This will disable the laser spot. You will still see the broader red cone (if not disabled) and the ability to read symbols will not be affected.

Turn Target Spot On



M055_01

Target Spot Brightness

Read one of the following symbols to set the brightness of the laser target spot:

High (Default)



M058_01

Medium

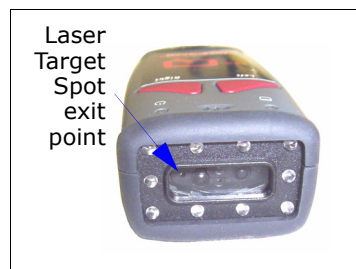


M057_01

Low



M056_01



Save changes whenever you reconfigure Imager settings.



M188_02

Save
Settings



M049_01

Default
to USB



M060_01

Default
to PS2



M071_01

Clear
all Data



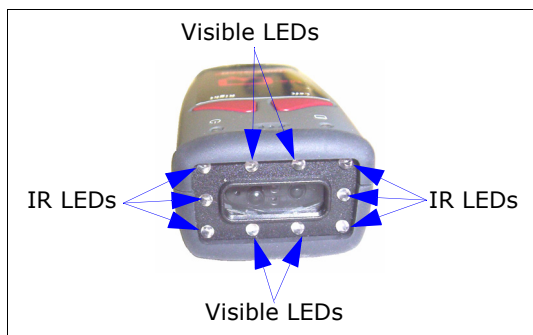
M052_01

Clear XML
Rules

Illumination

The illumination system is composed of four visible LEDs and six IR LEDs as shown in the illustration to the right. Both Visible and IR LEDs can be disabled independently. IR LEDs can also be set to low power.

For laser target spot, see "**Laser Target Spot**" on page 8-3.



IR LEDs

Some inks may be incompatible with IR lights. If having difficulty, try reducing the IR LED's intensity by reading the IR LEDs Low Power or disabling entirely by reading the IR LEDs Off.

IR LEDs Low Range



Q010_01

Sets the IR LEDs to a lower intensity range.

Does not turn OFF Visible LEDs.



This command turns OFF the near-field IR.

IR LEDs Off & Visible On



Q008_01

Turns OFF IR LEDs and turns ON Visible LEDs.

Visible LEDs Off and IR On



Q009_01

In some applications with bright reflective surfaces it might be desirable to turn off the visible LEDs. Read this symbol to do so.



This command turns OFF the near-field IR and turns ON the far-field IR.

Restore LEDs (default)



Q007_01

Restores both visible and IR LEDs (if OFF or set to low range).

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

MS-Q Indicators

MS-Q Indicators (All)

	 Memory LED (LEFT indicator)	 Battery LED^a (RIGHT indicator)	Sound
<i>Successfully powered-on</i>	Flash GREEN , AMBER or RED	Flash GREEN , AMBER or RED	1Beep
<i>Connection to Host Successful (USB or PS2)</i>	None	GREEN	1 Beep
<i>Attempting to Decode</i>	None	None	None
<i>Successful Decode and Data Transfer (cable)</i>	Flash GREEN	Flash GREEN , AMBER or RED	1 Beep
<i>Attempting to Connect (Bluetooth)</i>	Multiple BLUE Flashes	None	None
<i>Connection to Host Successful (Bluetooth)</i>	None	Flash RED once	1 Beep
<i>Connection to Host Failed (Bluetooth)</i>	Flash RED 4 Times	Flash RED 4 Times	4 Beeps
<i>Decode and Store</i>	Flash AMBER or RED	Flash GREEN , AMBER or RED	1 Beeps
<i>Batch Memory Full</i>	RED	Flash GREEN , AMBER or RED	3 Beeps
<i>Configuration Symbol Decoded and Processed</i>	Flash GREEN , AMBER or RED	None	1 Beep, slight pause, then 1 Beep
<i>Configuration Symbol Decoded but not Processed</i>	Flash GREEN , AMBER or RED	None	1 Beep, slight pause, then 3 Beeps

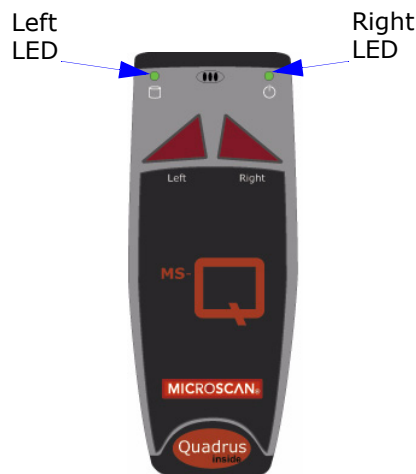
a. When power is supplied via cable, the LED will remain green whenever the MS-Q is active.

Left/Right LEDs

When not connected, the MS-Q will flash battery or power status every 15 seconds. The colors will vary depending on the message the MS-Q is sending.

- **GREEN** = 50-100% capacity of battery or 100% of memory available
- **AMBER** = 20-50% capacity of battery or 20-99% of memory available
- **RED** = 0-20% capacity of battery or no memory available
- **BLUE** = Bluetooth Mode

The MS-Q also emits beeps, or vibrates for user feedback. Please follow the table above to better understand your MS-Q's feedback.



Left Button Programming

Read any of the following symbols to change the left button's functionality:

Near/Far Fields

Read Symbols in Both Fields (Default)



M178_01

Read Symbols with Far-Field ONLY



M176_01

Read Symbols with Near-Field ONLY



M177_01

Upload Stored Data



M180_01

Left Button Take Picture



M179_01

Disable Left Button



Q011_01

Enable Left Button Mode Switching (Quadrus/Basic)



Q001_01



When in USB Image Uploader Mode, the trigger/button selected for image upload is thereafter unable to decode symbol data. You must either reset the trigger/button selected for image upload from another active trigger/button or from **ESP**, or if this is not possible, you must default the Imager.

Save changes whenever you reconfigure Imager settings.

Clear XML Rules



M052_01

Clear all Data



M071_01

Default to PS2



M060_01

Default to USB



M049_01

Save Settings



M188_02

Right Button Programming

Read any of the following symbols to change the right button's functionality:

Near/Far Fields

Read Symbols in Both Fields (Default)



M185_01

Read Symbols with Far-Field ONLY



M183_01

Read Symbols with Near-Field ONLY



M184_01

Upload Stored Data



M187_01

Right Button Take Picture



M186_01

Disable Right Button



Q012_01



When in USB Image Uploader Mode, the trigger/button selected for image upload is thereafter unable to decode symbol data. You must either reset the trigger/button selected for image upload from another active trigger/button or from **ESP**, or if this is not possible, you must default the Imager.

Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

Clear all Data



M052_01

Clear XML Rules

Handle Trigger Programming

Read any of the following symbols to change the handle trigger's functionality:

Near/Far Fields

Read Symbols in Both Fields (Default)



M157_01

Read Symbols with Far-Field ONLY



M155_01

Read Symbols with Near-Field ONLY



M156_01

Upload Stored Data



M158_01

Handle Trigger Take Picture



M154_01



When in USB Image Uploader Mode, the trigger/button selected for image upload is thereafter unable to decode symbol data. You must either reset the trigger/button selected for image upload from another active trigger/button or from **ESP**, or if this is not possible, you must default the Imager.

Save changes whenever you reconfigure Imager settings.

Clear XML Rules



M052_01

Clear all Data



M071_01

Default to PS2



M060_01

Default to USB



M049_01

Save Settings



M188_02

Beep and Vibrate Settings

Read the following symbols to set beep and vibration modes:

Vibrate/Beep

Vibrate Off/Beep On
(Default)



M108_01

Vibrate On/Beep On



M107_01

Vibrate On/Beep Off



M109_01

Beep Volume:

Beep High (Default)



M112_01

Beep Off



M110_01

Beep Low



M111_01

Save changes whenever you reconfigure Imager settings.



M188_02

Save
Settings



M049_01

Default
to USB



M060_01

Default
to PS2



M071_01

Clear
all Data



M052_01

Clear XML
Rules

LightRay Optics

For Direct Part Mark applications or other situations that involve hard-to-read symbols, the MS-Q can be used with an accessory called LightRay Optics. LRO is easy to set up and easy to use. The accessory comes in two series: the 100 series and the 200 series.

LightRay Accessory Options

Item	Part Number	MS-Q Compatibility
LightRay 100 NFOV (narrow field-of-view)	FIS-0001-0031	FIS-6100-0001, -0002, -0003, 0007
LightRay 110 WFOV (wide field-of-view)	FIS-0001-0032	FIS-6100-0004, -0005, -0006, -0008, all FIS-6150
Item	Part Number	MS-Q Compatibility
LightRay 205 NFOV (narrow field-of-view)	FIS-0001-0033	FIS-6100-0001, -0002, -0003, -0007
LightRay 215 WFOV (wide field-of-view)	FIS-0001-0034	FIS-6100-0004, -0005, -0006, -0008, all FIS-6150

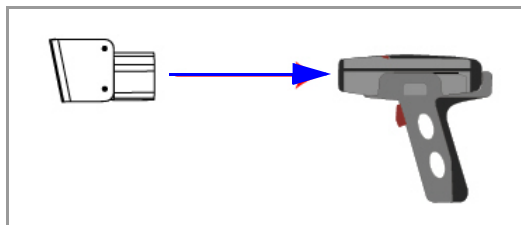
Setup

Optimize Performance	 M018_01 VGA Fast Read Mode (Handle Trigger)			
Choose Field of View	 M156_01 Near Field HR (100)	 M155_01 Far Field SR (110)	 M156_01 Near Field HR (205)	 M155_01 Far Field SR (215)
Set Up Illumination	 CC000203_02 Laser On LEDs On, 100% (100, 110)	 CC000203_01 Laser Off LEDs On, 100% (100, 110)	 CC000202_02 Laser On Visible LEDs Off IR LEDs On, 100% (205, 215)	 CC000202_01 Laser Off Visible LEDs Off IR LEDs On, 100% (205, 215)

Save changes whenever you reconfigure Imager settings.

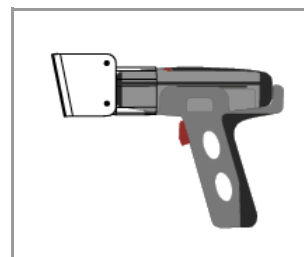
Clear XML Rules	 M052_01	Clear all Data	 M071_01	Default to PS2	 M060_01	Default to USB	 M049_01	Save Settings	 M188_02
-----------------	--	----------------	--	----------------	--	----------------	---	---------------	--

Assembly (100 Series)

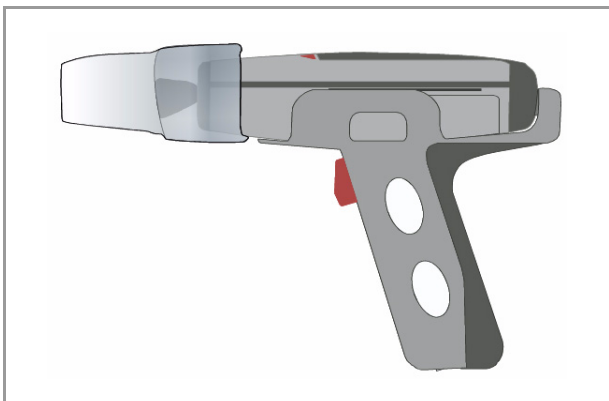


- Place the 100 Series LightRay Optic over the face of the MS-Q Handheld Imager.

- The plastic body of the LightRay Optic should be pressed firmly against the face of the Imager, allowing as little slippage as possible.
- Be sure that the LightRay Optic and the Imager's face are precisely aligned.



Assembly (200 Series)

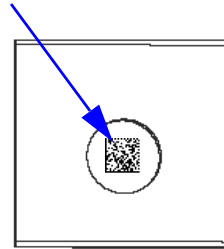
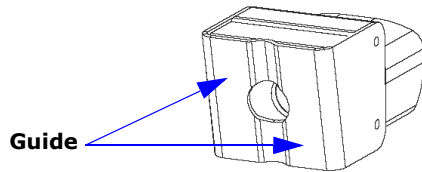


- Place the 200 Series LightRay Optic over the face of the MS-Q Handheld Imager.
- The plastic body of the LightRay Optic should be pressed firmly against the face of the Imager, allowing as little slippage as possible.
- Be sure that the LightRay Optic and the Imager's face are precisely aligned.

LightRay Optics

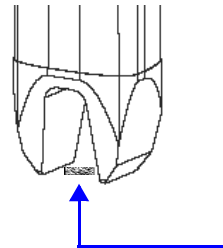
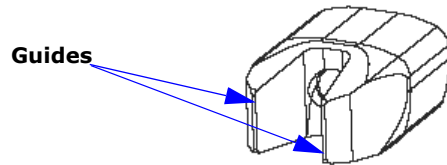
Reading Symbols (100 Series)

- For best results, begin triggering before the LightRay Optic has come in contact with the surface.
- Center the symbol in the LightRay Optic guide's cutout.



Reading Symbols (200 Series)

- For best results, begin triggering before the LightRay Optic has come in contact with the surface.
- Position the symbol equidistant from both of the 200 Series LightRay Optic's guides.



LightRay Optics by ESP

The MS-Q Handheld Imager can also be configured and optimized for LightRay operation using **ESP**.

I/O

Single click the **I/O Parameters** button to begin.

Click on the series you are using. The image of the attachment will glow when your model is selected.

Select Light Ray Optics Series

Specify whether you are using the Near Field or Far Field model in the series.

Light Ray Optics Model

- ☐ 100 Model (Read Near Field)
- ☒ 110 Model (Read Far Field)
- ☐ 205 Model (Read Near Field)
- ☐ 215 Model (Read Far Field)

☒ VGA Fast Read Mode

☒ Laser Target On

Trigger / Button:

Configure handle trigger or left and right buttons with Fast Read and laser targeting options.

UID (Unique Identifier)

- ☒ Enable
- ☒ Append Error Message
- ☒ Pass Through

☐ Auto Sync with Reader

Send Settings

Send and Save

Enable or disable UID Mode. (See Chapter 12, "Unique Identifiers".)

Send LightRay and UID settings to the Imager, or Send and Save settings simultaneously.

Chapter **9**

Advanced Operations

Chapter Contents

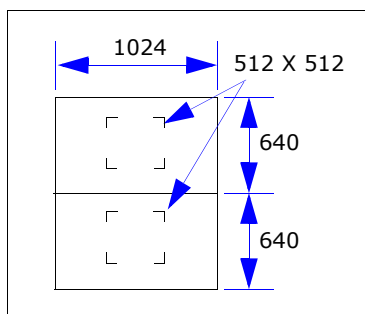
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This section introduces several settings that can be applied to speed up processing or improve readability in special circumstances.

Select Region of Interest

You can speed up the decode rate and lower your chances of reading the wrong symbol by narrowing the region of interest, the pixel area in the Imager that is evaluated during a read attempt.

If your application uses symbols that are significantly and consistently smaller than the default decode zone, you may be able to define a smaller decode zone.



At the heart of the Imager is a CMOS where light is collected by a pixel array of 1024 x 1280. One half of this array collects light from the near field, the other from the far field.

The sketch to the left represents the Imager array which in its entirety is a 1024 x 1280 array, one half which (1024 x 640) is applied to the near field, the other to the far.

In the default decode zone, all 1024 x 1280 pixels are candidates for decoding. When you select 512 x 512, the region of interest is narrowed to that shown by the dashed lines.

You can experiment by reading in any of the symbols below and testing your new decode zone against your application, or you can pre-determine your region of interest by following the steps described in ["Calculate FOV from Tables"](#) on page 9-3.



1-Dimensional Symbols Only
(200 x 1024 pixels)

Small 2-Dimensional Symbols
(480 x 480 pixels)



Medium 2-Dimensional Symbols
(512 x 512 pixels)



Large 2-Dimensional Symbols
(640 x 640 pixels)



Default 2-Dimensional Symbols
(1280 x 640 pixels)
Casts the broadest possible FOV.

Save changes whenever you reconfigure Imager settings.

Clear XML Rules



M052_01

Clear all Data



M071_01

Default to PS2



M060_01

Default to USB



M049_01

Save Settings



M188_02

Calculate FOV from Tables

1. In the following pages, find your **Distance From Target** in the appropriate table.
2. Measure the width of your symbol and add a comfortable buffer.
This is the width of your FOV (the x dimension).
3. Look across the table to find that FOV width that's closest to yours.
4. Go to the top of that column to find your FOV width.

From the symbols presented in **"Select Region of Interest"** on page 9-2 enable the one that has a FOV that closest matches yours. For 1-dimensional symbols, you will need to primarily consider the length.

Standard Resolution

Near Field									
Focal Distance = 4" (102 mm) (Horizontal Angle = 21.5 degrees, Vertical Angle = 16.2 degrees)									
Distance from Target		FOV 1024 x 640				320 x 320	480 x 480	512 x 512	640 x 640
		1024		640					
in.	mm	in.	mm	in.	mm	in.	in.	in.	in.
1	25	0.38	10	0.28	7	0.14	0.21	0.23	0.28
2	51	0.76	19	0.57	14	0.28	0.43	0.46	0.57
3	76	1.14	29	0.85	22	0.43	0.64	0.68	0.85
4	102	1.52	39	1.14	29	0.57	0.85	0.91	1.14
5	127	1.90	48	1.42	36	0.71	1.07	1.14	1.42
6	152	2.28	58	1.71	43	0.85	1.28	1.37	1.71
7	178	2.66	68	1.99	51	1.00	1.49	1.59	1.99
8	203	3.04	77	2.28	58	1.14	1.71	1.82	2.28
8.5	216	3.23	82	2.42	61	1.21	1.81	1.94	2.42
Far Field									
Focal Distance = 9" (229 mm) (Horizontal Angle = 22.9 degrees, Vertical Angle = 11.6 degrees)									
5	127	2.03	51	1.02	26	0.51	0.76	0.81	1.02
6	152	2.43	62	1.22	31	0.61	0.91	0.98	1.22
7	178	2.84	72	1.42	36	0.71	1.07	1.14	1.42
8	203	3.24	82	1.63	41	0.81	1.22	1.30	1.63
9	229	3.65	93	1.83	46	0.91	1.37	1.46	1.83
10	254	4.05	103	2.03	52	1.02	1.52	1.63	2.03
11	279	4.46	113	2.23	57	1.12	1.68	1.79	2.23
12	304	4.86	123	2.44	62	1.22	1.83	1.95	2.44
13	330	5.27	134	2.64	67	1.32	1.98	2.11	2.64
14	356	5.67	144	2.84	72	1.42	2.13	2.28	2.84
15	381	6.08	154	3.05	77	1.52	2.29	2.44	3.05
16	406	6.48	165	3.25	83	1.63	2.44	2.60	3.25
17	432	6.89	175	3.45	88	1.73	2.59	2.76	3.45
18	457	7.29	185	3.66	93	1.83	2.74	2.93	3.66
19	483	7.70	195	3.86	98	1.93	2.89	3.09	3.86
20	508	8.10	206	4.06	103	2.03	3.05	3.25	4.06

Calculate FOV from Tables

High Resolution

Near Field									
Focal Distance = 2.75" (70 mm) (Horizontal Angle = 21 degrees, Vertical Angle = 13 degrees)									
Distance from Target		FOV 1024 x 640				320 x 320	480 x 480	512 x 512	640 x 640
		1024		640					
in.	mm	in.	mm	in.	mm	in.	in.	in.	in.
0.5	13	0.19	5	0.11	3	0.06	0.09	0.09	0.11
1	25	0.37	9	0.23	6	0.11	0.17	0.18	0.23
1.5	38	0.56	14	0.34	9	0.17	0.26	0.27	0.34
2	51	0.74	19	0.46	12	0.23	0.34	0.36	0.46
2.5	64	0.93	24	0.57	14	0.28	0.43	0.46	0.57
2.75	70	1.02	26	0.63	16	0.31	0.47	0.50	0.63
3	76	1.11	28	0.68	17	0.34	0.51	0.55	0.68
3.5	89	1.30	33	0.80	20	0.40	0.60	0.64	0.80
4	102	1.48	38	0.91	23	0.46	0.68	0.73	0.91
Far Field									
Focal Distance = 4.5" (11 mm) (Horizontal Angle = 21 degrees, Vertical Angle = 13 degrees)									
2	51	0.74	19	0.46	12	0.23	0.34	0.36	0.46
2.5	64	0.93	24	0.57	14	0.28	0.43	0.46	0.57
3	76	1.11	28	0.68	17	0.34	0.51	0.55	0.68
3.5	89	1.30	33	0.80	20	0.40	0.60	0.64	0.80
4	102	1.48	38	0.91	23	0.46	0.68	0.73	0.91
4.5	114	1.67	42	1.03	26	0.51	0.77	0.82	1.03
5	127	1.85	47	1.14	29	0.57	0.85	0.91	1.14
5.5	140	2.04	52	1.25	32	0.63	0.94	1.00	1.25
6	152	2.22	56	1.37	35	0.68	1.03	1.09	1.37
6.5	165	2.41	61	1.48	38	0.74	1.11	1.18	1.48
7	179	2.59	66	1.60	41	0.80	1.20	1.28	1.60
7.5	191	2.78	71	1.71	43	0.85	1.28	1.37	1.71
8	203	2.97	75	1.82	46	0.91	1.37	1.46	1.82
8.5	216	3.15	80	1.94	49	0.97	1.45	1.55	1.94
9	229	3.34	85	2.05	52	1.03	1.54	1.64	2.05

For example, you have a Standard Resolution MS-Q that is reading a 0.45" symbol width in the near field at 4". You look across the 4" row to find a FOV width that's approximately twice your symbol size, 0.91. Your pixel width for this size is 512. Read the Medium 2-dimensional symbol in **"Select Region of Interest"** on page 9-2 to narrow your FOV accordingly.

Set Decode Timeouts

The MS-Q's default settings are designed for optimal, general purpose performance with high quality symbols on typical surfaces. For poor quality symbols ("noisy" symbols, for example), more decode time may be required. You can control the amount of time the Imager spends on each decode attempt before abandoning the current attempt and beginning a new attempt.

Short Decode Timeout



M217_01

Normal Decode Timeout (Default) (Approximately 375 mS)



M152_01

Long Decode Timeout (Approximately 675 mS)



M151_01

Extra Long Decode Timeout (Approximately 750 mS)



M148_01

Save changes whenever you reconfigure Imager settings.



M188_02

Save
Settings



M049_01

Default
to USB



M060_01

Default
to PS2



M071_01

Clear
all Data



M004_01

Clear XML
Rules

Set Targeting Zone Tolerances

Targeting Zone Tolerance is particularly useful in environments where closely spaced symbols of various sizes need to be precisely targeted.

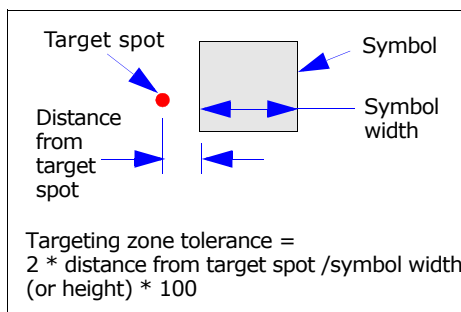
It allows the Imager to effectively narrow the field-of-view relative to the size of a symbol and thus determine how close your target spot can be to a symbol and still be a candidate for decoding.

It does this by counting the number of pixels across a symbol and comparing that with the distance (in pixels) the target spot is from the edge of the symbol (x 2). The exact formula is shown in the diagram to the right.

For example, a target tolerance of 100% would require the target spot to be no more than half the dimension (width or height) of the symbol. So for a symbol that is 100 pixels across, the target spot must be within 50 pixels on either side. A 100 pixel symbol with a 50% tolerance must be within 25 pixels on either side of the symbol.

The symbols presented below represent a range of tolerances, the 50 setting being the most precise (least tolerant) and the 1600 symbol being the most tolerant. If you set the unit to a 50% tolerance, you will need to aim the targeting spot directly on the desired symbol for it to be read.

Read one of the following symbols to set the decode accuracy of the MS-Q Imager.



Unlimited (Default)



M196_01

50%



M189_01

75%



M190_01

100%



M191_01

125%



M192_01

150%



M193_01

200%



M195_01

400%



M194_01

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Continuous Operations

Continuous Read

Read any of the following symbols to turn scanning on/off.

Both Near & Far Field



M138_01

Near Field Only



M140_01

Far Field Only



M139_01

Off (Default)



M141_01



This function is only recommended for short term use because of battery consumption. See **"Sleep Mode Timeout"** on page 5-6.

Continuous Read, Sleep Timeout

Sets the time a cabled Imager will operate in Continuous Read before entering Sleep Mode.

Cabled - 2 Hours (Default)



M136_01

Cabled - Persistent



M137_01

Read one of the symbols below to set the time an uncabled Imager will operate in Continuous Read Mode before entering Sleep Mode.

Uncabled - 5 Minutes
(Default)



M145_01

Uncabled - 15 Minutes



M146_01

Uncabled - 30 Minutes



M147_01



This function is only recommended for short term use because of battery consumption. See **"Sleep Mode Timeout"** on page 5-6.

Save changes whenever you reconfigure Imager settings.



M188_02

Save
Settings



M049_01

Default
to USB



M060_01

Default
to PS2



M071_01

Clear
all Data



M004_01

Clear XML
Rules

Continuous Operations

Continuous Read, Trigger Delays

Read the following symbols to set the delay time between reads.

0 Seconds (Default)



M142_01

1 Second



M143_01

3-5 Seconds



M144_01

Continuous Read, Duplicate Read Delays

Read the following symbols to set the delay time for reading duplicate symbols.

0 Seconds (Default)



M222_01

1 Second



M223_01

3-5 Seconds



M224_01

Continuous Read Off



M141_01

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Change IP Mode

Standard Mode



Q002_01

(Default)

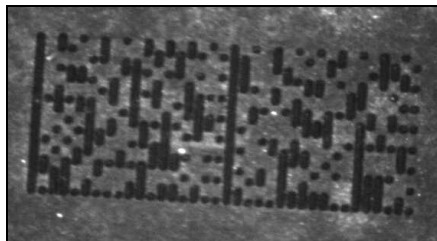
Standard Mode should be applied to most applications (including DPM).

Mode 1



Q003_01

Mode 1 is applicable to symbols that are large and have low contrast (as shown below).



Basic Mode



Q004_01

Basic Mode, while not recommended for DPM applications, can be applied to most symbologies.



This function applies ONLY to the MS-Q Quadrus Imager.



Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

Clear all Data



M004_01

Clear XML Rules

Optimizing the Imager

You can program all triggers or each trigger individually so that it is optimized for symbologies of certain densities and sizes. The table below describes the various configuration settings that can be obtained (**A1** through **D3**) by reading the symbols in the subsequent tables.

Optimization Guide

 Region of Interest	High and Low Density Symbols <i>Near and Far Field</i>		High Density Symbols <i>Near Field</i>	Low Density Symbols <i>Far Field</i>
	A1 - SXGA Mode Near Field Decoding: On Far field Decoding: On NF Resolution: 1024 x 640 FF Resolution: 1024 x 640 Decode Try Time: Long	B1 - SXGA Mode Near Field Decoding: On Far field Decoding: On NF Resolution: 1024 x 640 FF Resolution: 1024 x 640 Decode Try Time: Normal	C1 - SXGA Mode Near Field Decoding: On Far field Decoding: Off NF Resolution: 1024 x 640 FF Resolution: NA Decode Try Time: Normal	D1 - SXGA Mode Near Field Decoding: Off Far field Decoding: On NF Resolution: NA FF Resolution: 1024 x 640 Decode Try Time: Normal
	A2 - SXGA Mode Near Field Decoding: On Far field Decoding: On NF Resolution: 832 x 640 FF Resolution: 1024 x 640 Decode Try Time: Normal	B2 - SXGA Mode Near Field Decoding: On Far field Decoding: On NF Resolution: 640 x 512 FF Resolution: 832 x 640 Decode Try Time: Short	C2 - SXGA Mode Near Field Decoding: On Far field Decoding: Off NF Resolution: 640 x 640 FF Resolution: NA Decode Try Time: Normal	D2 - SXGA Mode Near Field Decoding: Off Far field Decoding: On NF Resolution: NA FF Resolution: 832 x 512 Decode Try Time: Normal
	A3 - SXGA Mode Near Field Decoding: On Far field Decoding: On NF Resolution: 480 x 480 FF Resolution: 640 x 480 Decode Try Time: Short			
Fast Processing (VGA Mode)		B3 - VGA Mode Near Field Decoding: On Far field Decoding: On NF Resolution: 480 x 320 FF Resolution: 480 x 320 Decode Try Time: Short	C3 - VGA Mode Near Field Decoding: On Far field Decoding: Off NF Resolution: 480 x 320 FF Resolution: NA Decode Try Time: Short	D3 - VGA Mode Near Field Decoding: Off Far field Decoding: On NF Resolution: NA FF Resolution: 480 x 320 Decode Try Time: Short

Definitions:

Symbol Density: Width of the narrowest bar of a linear symbol or the side of an individual element (cell) of a Data Matrix symbol.

Resolution: The number of pixels available for decoding in a given area.

Decode Try Time: The time spent attempting to decode a given symbol.

Region of Interest: The pixel area in the Imager that is evaluated during a read attempt.

Use the tables on the following pages to program your trigger(s) for the fields-of-view and symbol densities that best match your applications. See "**Optimization Parameters**" for more detailed explanations of each setting, and for examples of conditions for which you would use each setting.

Left Button Optimization

	High and Low Density Symbols <i>Near and Far Field</i>		High Density Symbols <i>Near Field</i>	Low Density Symbols <i>Far Field</i>
 Region of Interest	A1  M025_01	B1  M028_01	C1  M031_01	D1  M034_01
	A2  M026_01	B2  M029_01	C2  M032_01	D2  M035_01
	A3  M027_01			
Fast Processing (VGA Mode)	B3  M030_01		C3  M033_01	D3  M036_01

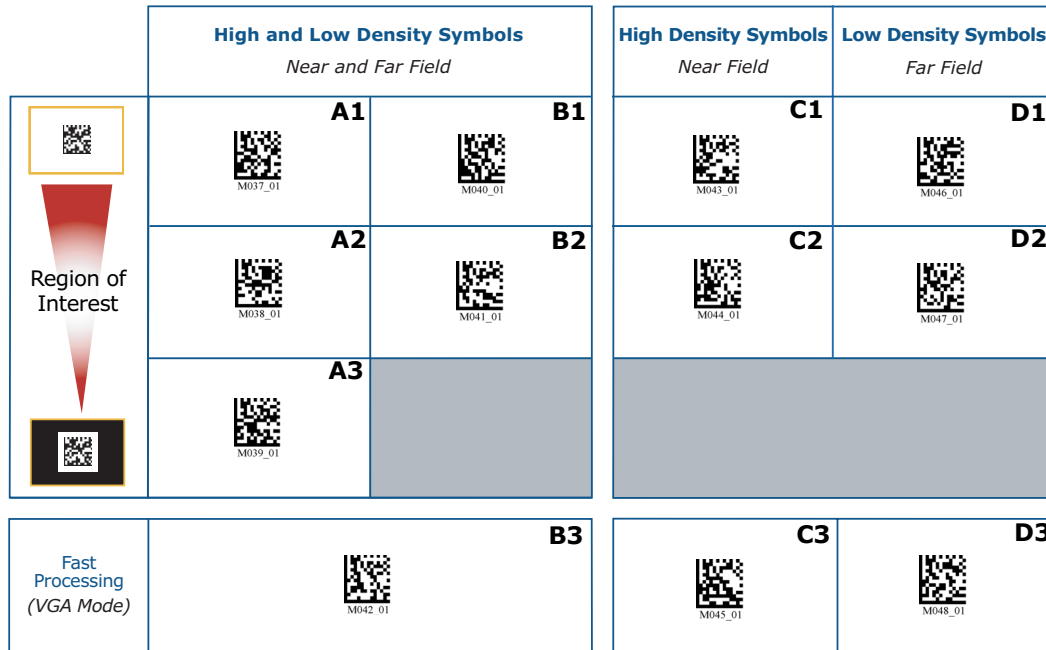


Disable Left Button



See **“Optimization Parameters”** for more detailed explanations of each setting, and for examples of conditions for which you would use each setting.

Right Button Optimization



Q012_01

Disable Right Button



See **"Optimization Parameters"** for more detailed explanations of each setting, and for examples of conditions for which you would use each setting.

Save changes whenever you reconfigure Imager settings.

Clear XML Rules



M052_01

Clear all Data



M071_01

Default to PS2



M060_01

Default to USB



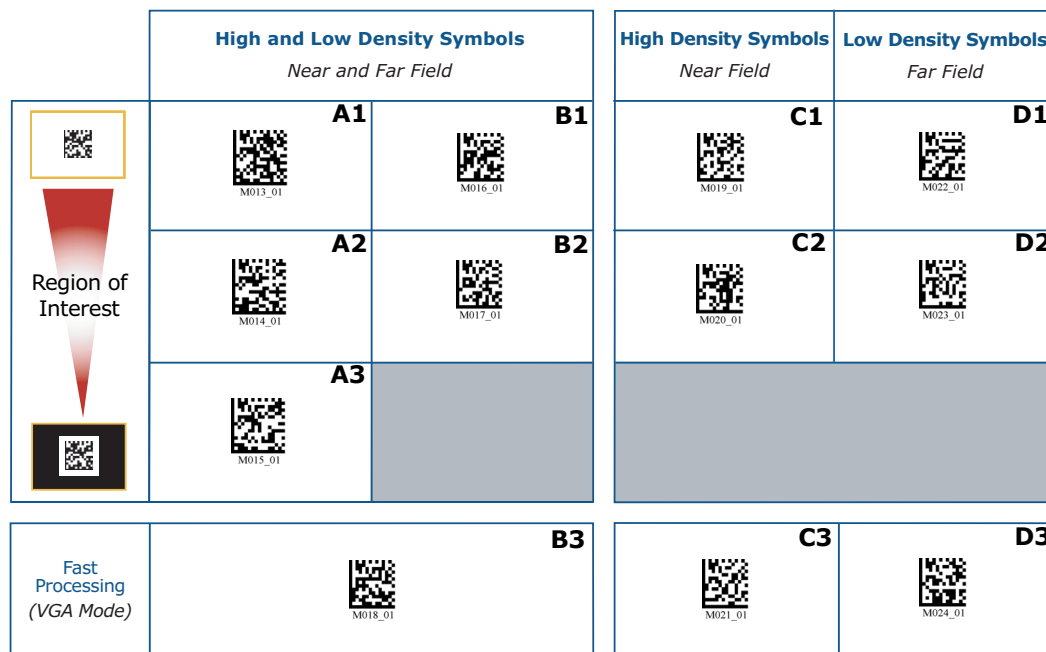
M049_01

Save Settings



M188_02

Handle Trigger Optimization



See **"Optimization Parameters"** for more detailed explanations of each setting, and for examples of conditions for which you would use each setting.

Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

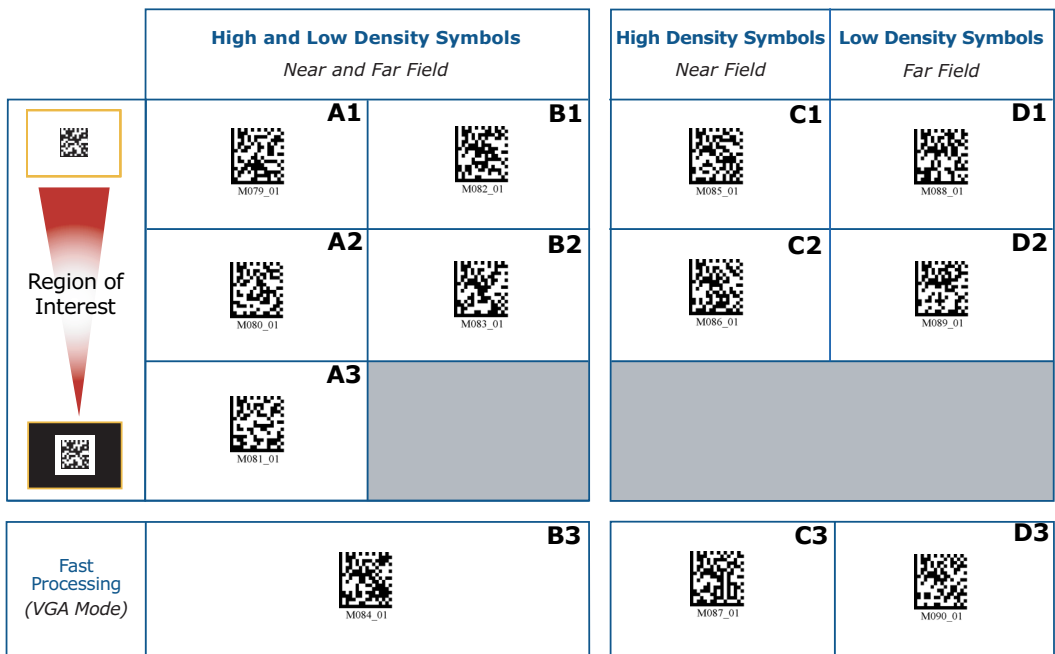
Clear all Data



M004_01

Clear XML Rules

Continuous Trigger Optimization



Disable Continuous Trigger Optimization
Disables Continuous Trigger Optimization settings.



See **“Optimization Parameters”** for more detailed explanations of each setting, and for examples of conditions for which you would use each setting.

Save changes whenever you reconfigure Imager settings.

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



M049_01

Save
Settings



M188_02

Optimization Parameters

The following 12 settings (**A1** through **D3**) allow you to optimize your Imager's performance in your application environment. Try several settings to familiarize yourself with the differences between the 12 options. You may find that the Imager's default setting, **B3**, is satisfactory for your application.

Use **A1** if you are reading a variety of symbol densities and sizes, and you are more concerned with decode capability than with decode speed.

Use **A2** if you are reading a variety of symbol densities and sizes, and you want dependable but moderately fast decodes.

Use **A3** if you are reading a variety of symbol densities and sizes, but you are concerned mainly with obtaining fast decodes.

Use **B1** if you are reading a variety of symbol densities and sizes, and you need reliable, moderately fast decodes.

Use **B2** if you are reading a variety of symbol densities and sizes, and you want a balance of decode reliability and decode speed.

Use **B3** if you are reading a variety of symbol densities and sizes, but you want the fastest available decode speed.

High and Low Density Symbols

Near and Far Field

A1: Reads high and low density symbols at high resolution in near and far fields; spends 675 mS attempting to decode the symbol; large region of interest that extends beyond the symbol.

B1: Reads high and low density symbols in near and far fields at high resolution in both fields; spends 375 mS attempting to decode the symbol; large region of interest that extends beyond the symbol.

A2: Reads high and low density symbols in near and far fields at medium-high resolution in near field and high resolution in far field; spends 375 mS attempting to decode the symbol; region of interest that extends somewhat beyond the symbol.

B2: Reads high and low density symbols in near and far fields at medium-low resolution in near field and medium-high resolution in far field; spends 250 mS attempting to decode the symbol; region of interest that extends somewhat beyond the symbol.

A3: Reads high and low density symbols at low resolution in near field and medium-low resolution in far field, spends 250 mS attempting to decode the symbol; region of interest limited to the symbol and its quiet zone.

B3: Reads high and low density symbols in near and far fields at low resolution in both fields; spends 250 mS attempting to decode the symbol; small region of interest limited to the symbol and its quiet zone.



See the "**Optimization Guide**" for definitions of optimization terminology.

Optimization Parameters

High Density Symbols <i>Near Field</i>	Low Density Symbols <i>Far Field</i>	Use C1 if you are reading small or medium high density symbols and you need reliable and moderately fast decodes.
C1: Reads high density symbols only at high resolution in near field only; spends 375 mS attempting to decode the symbol; large region of interest that extends beyond the symbol.	D1: Reads low density symbols only at high resolution in far field only; spends 375 mS attempting to decode the symbol; large region of interest that extends beyond the symbol.	Use C2 if you are reading small or medium high density symbols and you are more concerned with decode speed than reliability.
C2: Reads high density symbols only at medium-low resolution in near field only; spends 375 mS attempting to decode the symbol; region of interest that extends somewhat beyond the symbol.	D2: Reads low density symbols only at medium resolution in far field only; spends 375 mS attempting to decode the symbol; region of interest that extends somewhat beyond the symbol.	Use C3 if you are reading small or medium high density symbols and obtaining fast decodes is your most important concern.
		Use D1 if you are reading medium or large low density symbols and you want reliable and moderately fast decodes.
		Use D2 if you are reading medium or large low density symbols and you want a balance of decode reliability and decode speed.
		Use D3 if you are reading medium or large low density symbols and obtaining fast decodes is your most important concern.
C3: Reads high density symbols only, at low resolution in near field only; spends 250 mS attempting to decode the symbol; small region of interest limited to the symbol and its quiet zone.	D3: Reads low density symbols only at low resolution in far field only; spends 250 mS attempting to decode the symbol; small region of interest limited to symbol and its quiet zone.	



See the **"Optimization Guide"** for definitions of optimization terminology.

Optimization by ESP

You can set all the same operation parameters in **ESP's Imager** window.



Single click the **Imager** button to begin.

Trigger Optimization

The screenshot shows the 'Trigger Optimization' window in the ESP Imager. It includes a 'Trigger' dropdown menu set to 'Continuous', an 'Auto Sync with Reader' checkbox, and a 'Send and Save' button. The main area is a grid of optimization buttons labeled A1 through D3, organized into four sections: 'High and Low Density Symbols' (Near and Far Field), 'High Density Symbols' (Near Field), 'Low Density Symbols' (Far Field), and 'Fast Processing (VGA Mode)'. A 'Region of Interest' icon is on the left. A 'Configuration Status' section at the bottom lists settings for various triggers. A callout points to the 'Trigger' dropdown, stating: 'Choose which trigger or button to optimize from the dropdown menu.' Another callout points to buttons C1 and D1, stating: 'Each optimization button corresponds with a setting on the "Optimization Guide" (page 9-10).' A third callout points to the 'Configuration Status' section, stating: 'The "Configuration Status" display shows settings for each trigger or button.' A fourth callout points to button A1, showing a context-sensitive help popup with the following settings:

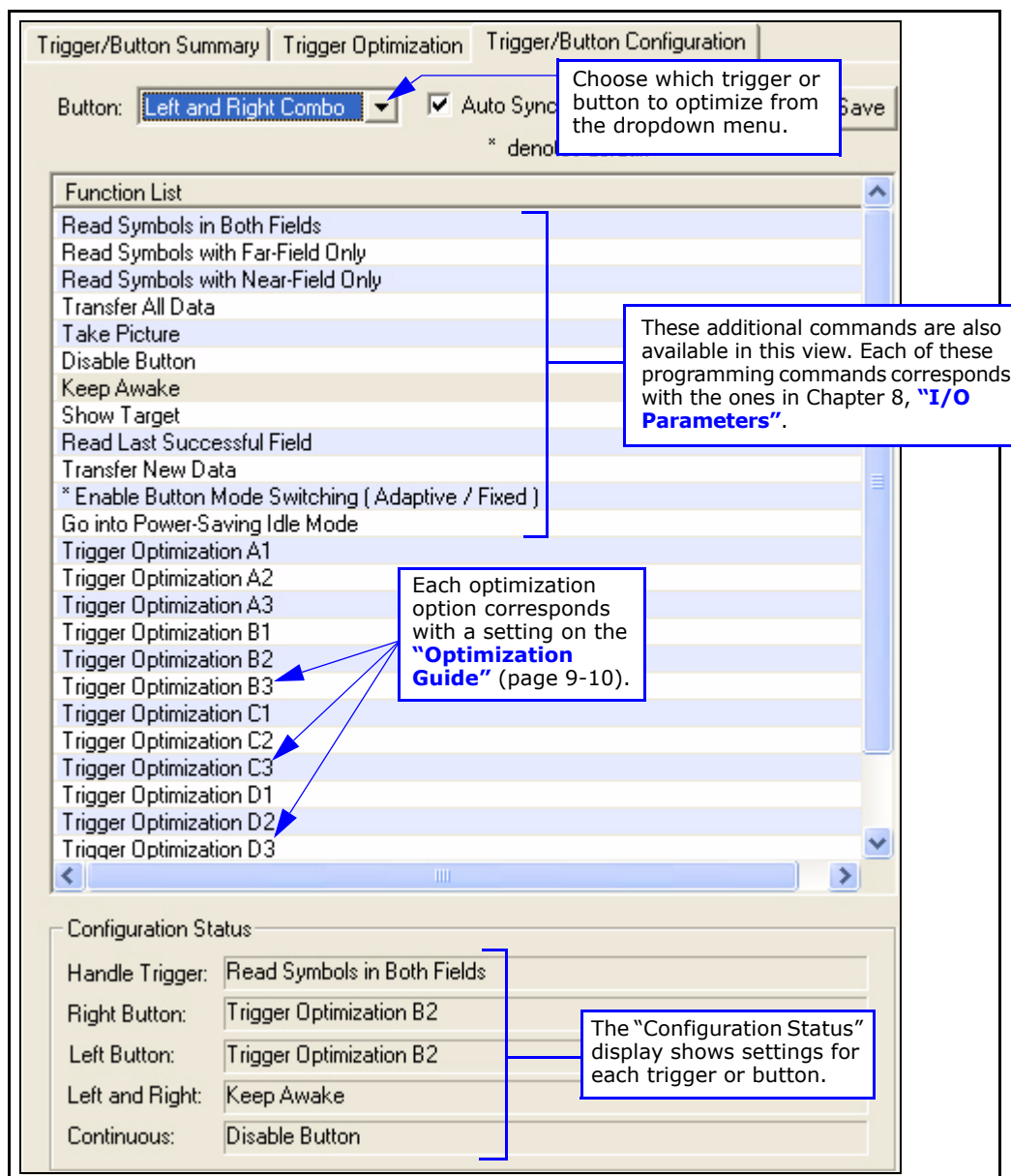
- SXGA Mode
- Near Field Decoding: On
- Far Field Decoding: On
- NF Resolution: 480 X 480
- FF Resolution: 640 X 480
- Decode Try Time: Short

A final callout points to the help popup, stating: 'Each optimization button displays a context-sensitive help popup that corresponds with a setting on the "Optimization Guide" (page 9-10).'

Trigger/Button Configuration

Trigger/Button Configuration

In the **Trigger/Button Configuration** view you can set the same optimization parameters from a list, and you can also set other parameters from the same list, such as **Transfer All Data**, **Take Picture**, or **Disable Button**.



Trigger/Button Summary

The **Trigger/Button Summary** tab repeats the **Configuration Status** view of the other two tabs, but supplements the view with a diagram of the MS-Q Handheld Imager.

A graphic interface orients you to the location of the Imager's handle trigger and left and right buttons.

The "Configuration Status" display shows settings for each trigger or button.

Trigger/Button Summary
Trigger Optimization
Trigger/Button Configuration

☒ Auto Sync Settings with Reader



Configuration Status

Handle Trigger:	Read Symbols in Both Fields
Right Button:	Trigger Optimization B2
Left Button:	Trigger Optimization B2
Left and Right:	Trigger Optimization D1
Continuous:	Disable Button

Mirrored

Mirrored

Symbols that are mirrored (flipped horizontally or vertically) can only be read if the **Enable Mirrored** symbol has been read.



Once an Imager has been set to **Enable Mirrored**, you can only return to its default mode by reading the **Disable Mirrored** symbol.

Enable Mirrored



After reading this symbol, the Imager will ONLY read mirrored symbols.

Disable Mirrored (Default)



After reading this symbol, the Imager defaults to the normal state and reads ONLY normal (unmirrored) symbols.

Example of Mirrored



ABCDEFGHIJKLMNOP

Example of Normal



ABCDEFGHIJKLMNOP



Mirrored symbols can be read on either dark or light backgrounds.

Symbol Readability Index

The Readability Index provides a measurement of a specific symbol's readability. It is specific to the MS-Q Imager and should not be confused with a verification quality measurement.

The Readability Index is a blend of information obtained from the internal operations of the decoding algorithm relating to contrast, symbology construct, error detection, forward error correction (if applicable), and other symbology-specific characteristics.

The Index is a score on a scale of 1 (very poor) to 100 (very readable). Due to the effects of motion, skew, reflection, focus, and ambient light, the Readability Index on the same symbol may vary somewhat from read to read. However, a poor contrast or damaged symbol will score lower than a high contrast undamaged symbol. The Index can be used as a quick check on the reliability of label generation or marking systems. When used in conjunction with a stand and constant ambient light, the Index provides a symbol quality-assurance tool and check-point for feedback to an overall symbol or marking quality control system.

The Readability Index is enabled by first reading an XML rule into the permanent Imager memory.

Symbol Readability Index Rule

Enable Symbol Readability Index Rule



M061_01



(Microscan)

Example:

With Readability Index Rule enabled, decoded symbol data output will be accompanied by the 0-100 readability rating.

Readability Index Output:

100 (Symbol Quality), Microscan (Symbol Data)

The Imager will store the rule and reset, but will not output the Readability Index until the **Enable Readability Index Output** symbol is read. Once read, each time a data symbol is read, the index will be output, followed by a comma, followed by the decoded data.

Enable/Disable Readability Index Output

When enabled, the Imager will continue to output the Readability Index upon every read until disabled, either by reset or by reading **Disable Readability Index Output**.

Enable Readability Index Output



M062_01

Disable Readability Index Output



M063_01



This feature available for **Basic** Mode only.

Chapter

10

Terminal Mode

Chapter Contents

Terminal Window	10-2
Find Function	10-3
Macros	10-4
Terminal Window Functions.....	10-5

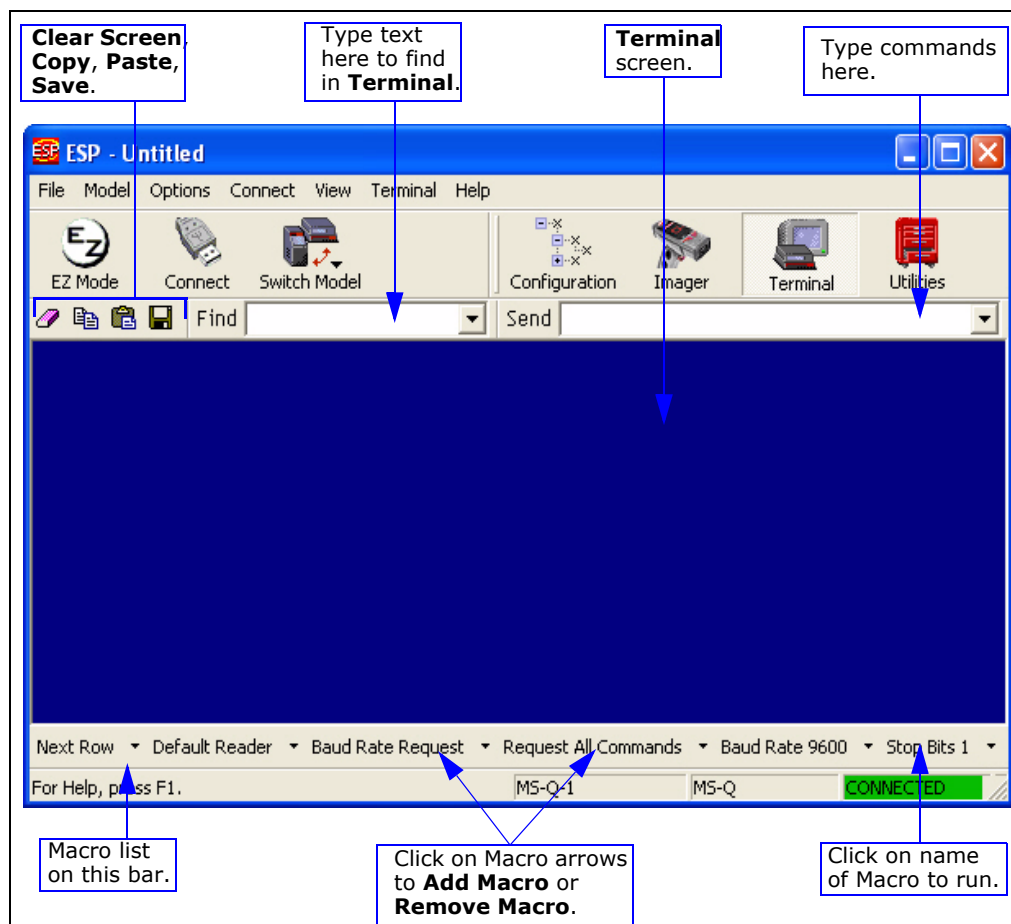
This section describes the terminal window and macro functions in **ESP**.

Terminal Window

To use **ESP's Terminal**, click the **Terminal** button.



You will see the following view:



The terminal screen allows you to enter serial commands (in **red**) from the macro box, by copying, or directly from your keyboard.

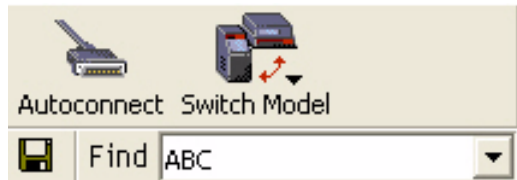
The terminal screen also displays symbol data or information from the Imager (in **blue**).

You can also right click in the terminal screen to bring up a menu of further options.

Find Function

The **Find** box allows you to enter text strings to be searched for in the terminal window. For example a series of symbols have been scanned into the terminal view and you want to determine if a particular code starting with ABC has been read.

1. Type **ABC** into the **Find** box.

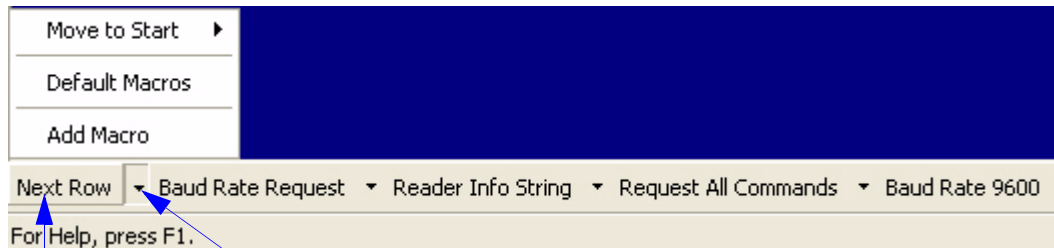


2. Press **Enter**.
The first instance of **ABC** will be highlighted in the terminal window.
3. Press the **F3** key to search again for the next instance of **ABC**.
4. Press **Shift-F3** to search for the previous instance of **ABC**.

Macros

Macros

Macros can be stored in a macro selection bar, edited in a separate window, and executed by clicking on the macro name.



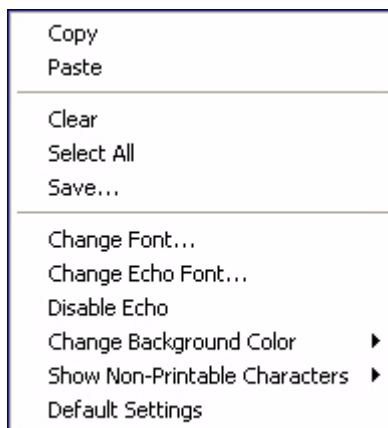
Click on **Next Row** to see the next row of macros

Click on the first arrow here to see **Add Macro** or **Default Macros**.
When you default macros, the entire macros set is restored to their original macro commands.

When you click on the macro name, the macro is executed in the terminal window. If this is a command, the command is also sent to the reader at the same time it is displayed.

Terminal Window Functions

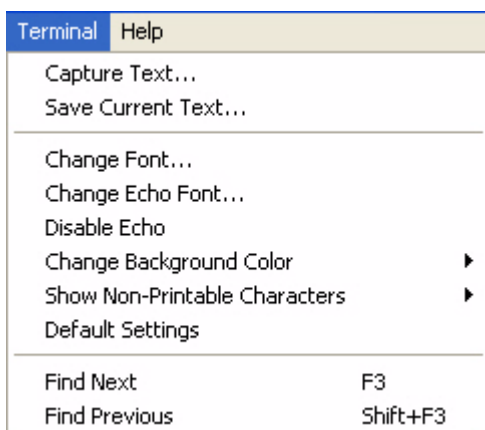
Right-click on the **Terminal** window to display the following menu:



- **Copy** selected text to clipboard.
- **Paste** from terminal or computer text.
- **Clear** all text in terminal window.
- **Select All** text in the terminal window.
- **Save...** brings up a "Save As" dialog box.
- **Change Font...** of data text. Brings up a text dialog.
- **Change Echo Font...** to change the appearance of data text from the Imager.
- **Disable Echo** to turn off echoed data from the Imager.
- **Change Background Color** of the terminal window.
- **Show Non-Printable Characters** in the terminal window.
- **Default Settings** to return all of the above to original settings.

Terminal Pulldown Menu

The pulldown **Terminal** menu allows you to capture and save current text, and it also includes the functions defined above.



- **Capture Text...** lets you append data in real time to a text file of your choice. While in operation, the text file cannot be opened. You can select **Pause** to interrupt the capture flow or **Stop** to end the flow and open the file.
- **Save Current Text...** saves all text in the terminal window to a text file of your choice.

Terminal Window Functions

Chapter

11

Utilities

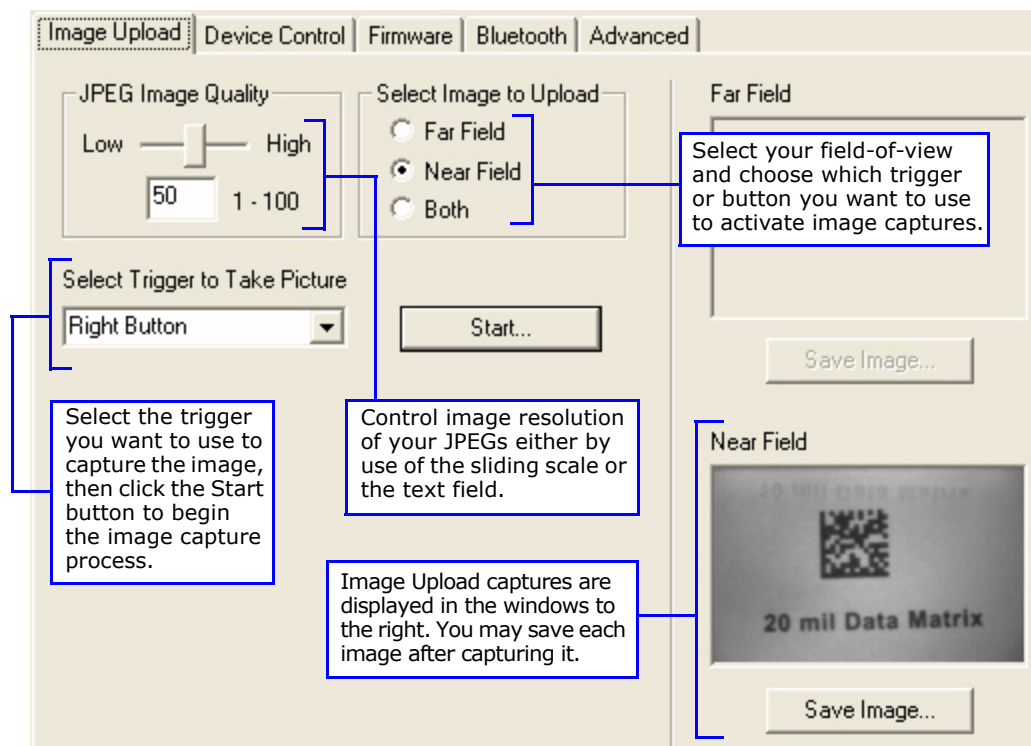
Chapter Contents

Image Upload	11-2
Device Control	11-3
Firmware	11-4
Bluetooth	11-6
Advanced	11-7

This chapter explains **ESP's Utilities** features. These include **Image Upload**, which allows you to capture images using the MS-Q; **Device Control**, a powerful interface that lets you perform major operations with one click; **Firmware**, where you can update your Imager's firmware in only a few simple steps; **Bluetooth**, which can produce a Quick Connect symbol from alphanumeric text input; and **Advanced**, which allows you to collect batch files for customized Imager configuration and optimization.

Image Upload

There are several reasons you might need to capture images of symbols in your application. **ESP's Image Upload** feature is a convenient way to collect image captures for tracking, quality control, comparisons between symbols, or various other tasks.



You can also control the settings for **Image Upload** using the configuration symbols below:



USB Image Upload Mode



Handle Trigger Take Picture



Right Button Take Picture



Left Button Take Picture



Near Field



Far Field



When in **Image Upload Mode**, the trigger/button selected for image upload is thereafter unable to decode symbol data. You must either reset the selected trigger/button from another active trigger/button or from **ESP**, or, if this is not possible, you must default the Imager.



JPG



BMP

Device Control

This powerful tool allows you to clear data stored in the Imager's memory, to default the Imager, to deactivate or clear XML Rules, to log and upload error reports, to reboot the Imager, and to delete stored results.

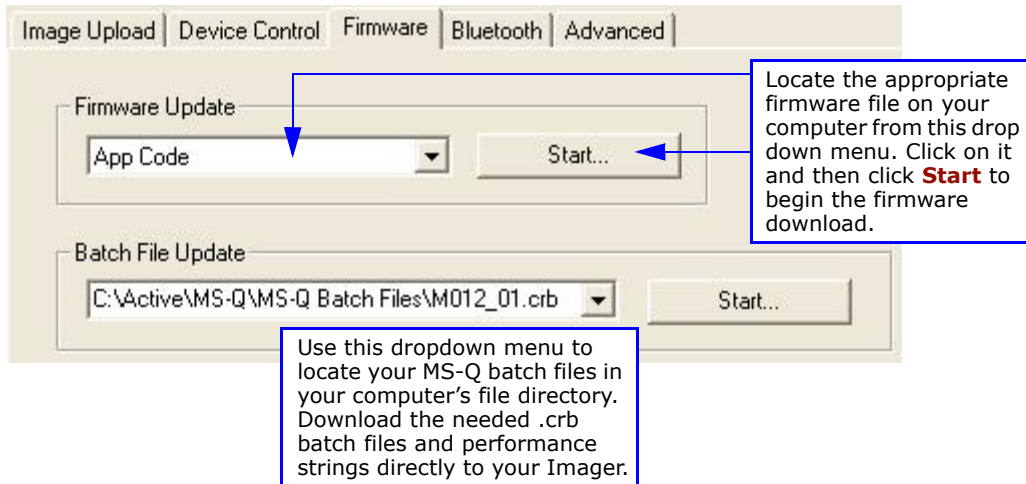
- **Clear All Data** removes decoded symbol data and commands in the Imager's memory.
- **Default Reader** returns the Imager to its default state, without any optimization or configuration.
- **Deactivate XML Rules** turns off, but does not erase, preambles, postambles, and XML commands.
- **Clear XML Rules** removes preambles, postambles, and other XML commands.

A small output window adjacent to the Device Control buttons displays error messages, text commands, and results of operations.

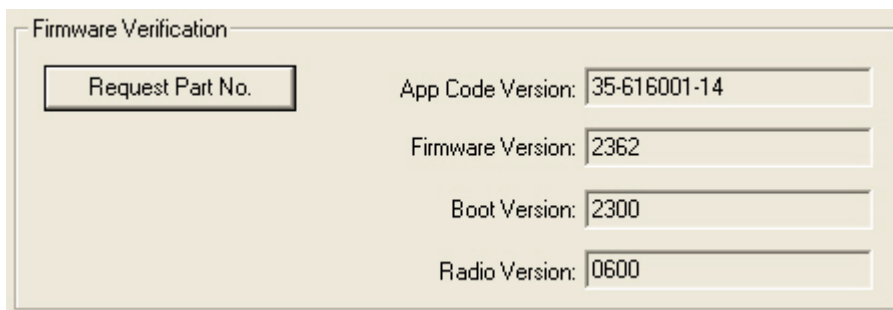
- **Upload Logged Errors** allows you to look at stored error reports.
- **Delete Stored Errors** erases all logged errors whether you have looked at them or not.
- **Reboot Reader** refreshes the Imager's memory and functionality, returning it to the most recent configuration you have saved.
- **Delete Stored Results** erases logged data.

Firmware

The **Firmware** view in **ESP Utilities** is a simple way to update and verify your Imager's firmware and to update batch files.



The **Firmware Verification** tool sends a direct to query to your Imager for its Application Code Version, its Firmware Version, its Boot Code Version, and its Radio Version.



Imager ID

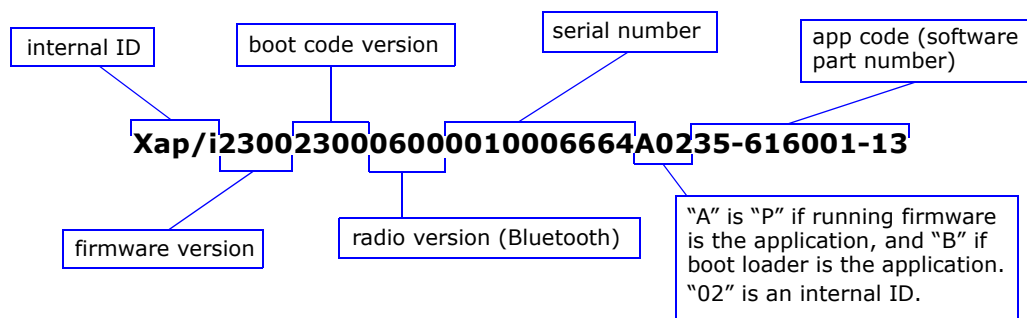
You can also query the Imager for its identification and firmware version by reading the following symbol:



*Imager ID
and Firmware Version*

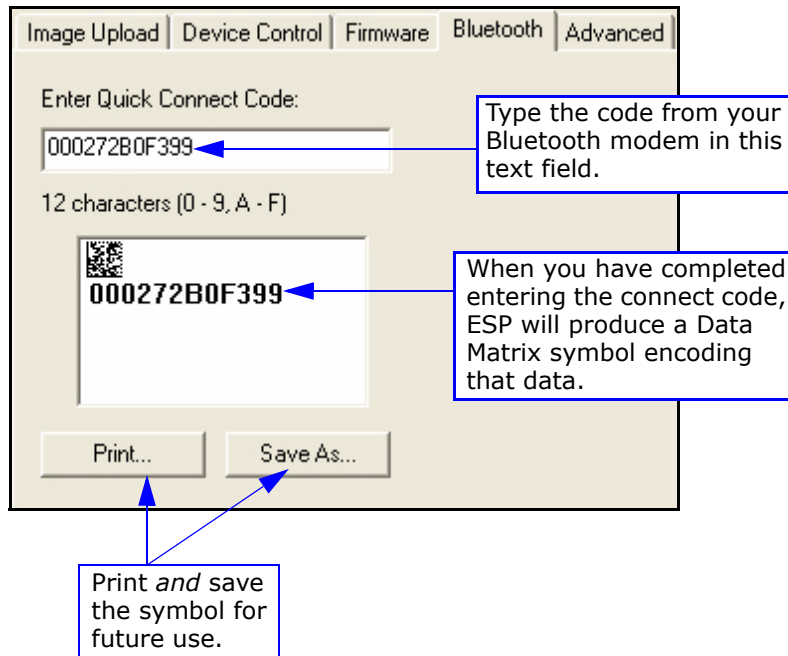
M153_01

The host's text program will output a data string containing your firmware version and ID number in the following format:



Bluetooth

The **Bluetooth** view in **Utilities** features a text field in which you can enter your Bluetooth modem's alphanumeric connection code. When you are finished entering this code, the small window below the text field displays a Data Matrix symbol that you can use to connect to a host instantly. (ESP does not support Bluetooth.)

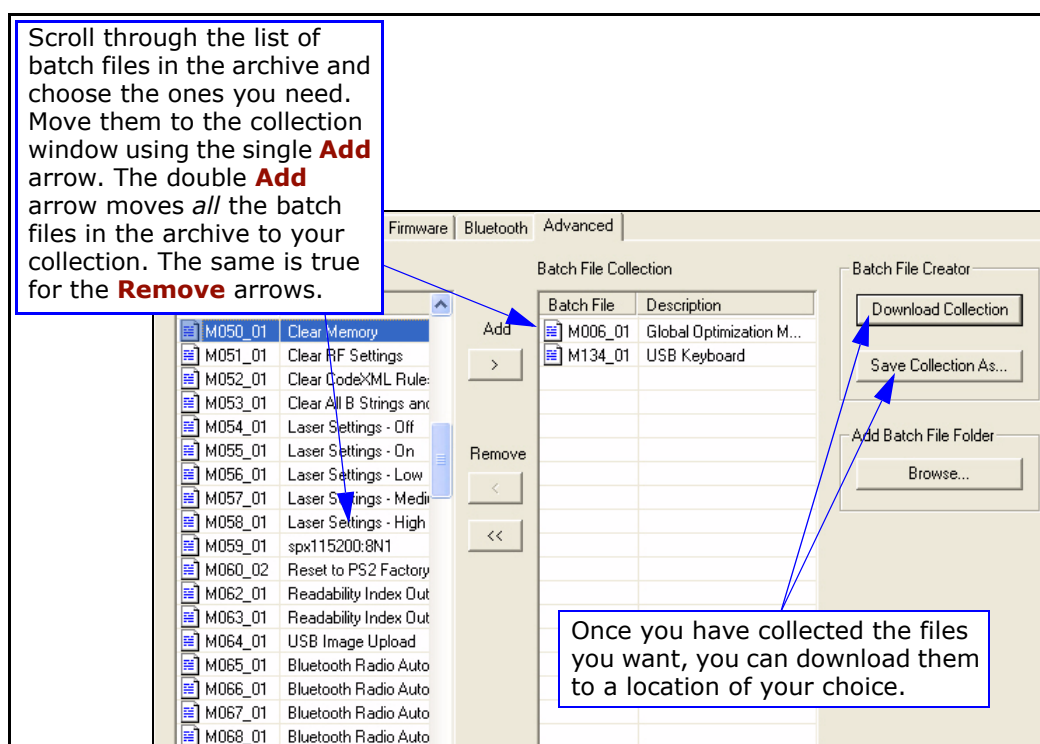


Microscan's Bluetooth Modem comes with a connect code embedded in a Data Matrix symbol on the product label. This symbol can be read for an even quicker connection.

Advanced

The **Advanced** tab in **Utilities** contains an archive of all batch files for the MS-Q. Each batch file's extension is .crb, and each file contains the fundamental code for programming the MS-Q Handheld Imager. Notice that the names of the batch files correspond with the "M numbers" beneath all the Data Matrix configuration symbols in this manual.

This tool allows you to use the batch file data to create your own symbols, or to collect only the files that you use frequently to configure the Imager for your application.



Chapter

12

Unique Identifiers

Chapter Contents

UID Overview	12-2
Non-UID Characters in a UID Message Stream	12-3
UID Mode Features	12-4
Error Messaging	12-5
Valid Formats.....	12-7

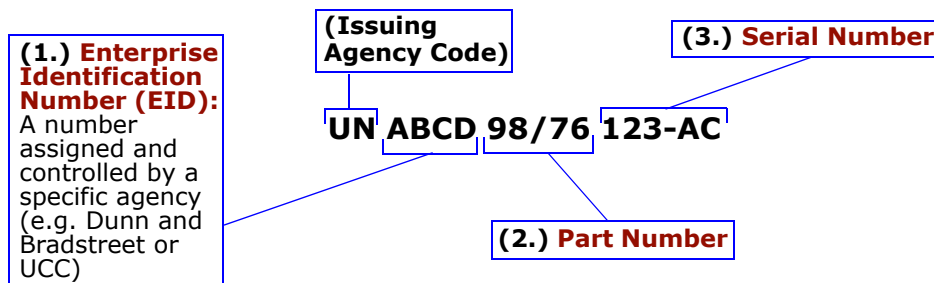
This section explains the structure and purpose of Unique Identifiers (UIDs), and how to configure the MS-Q Handheld Imager to read them.

UID Overview

The Department of Defense (DoD) now requires Unique Identification (UID) numbers for all products sold to the DoD by private vendors. A UID number can be thought of as a Social Security number for each part. The UID number must be encoded in an ECC 200 Data Matrix symbol that conforms to the data structure defined in the DoD's "Guide for Uniquely Identifying Items."

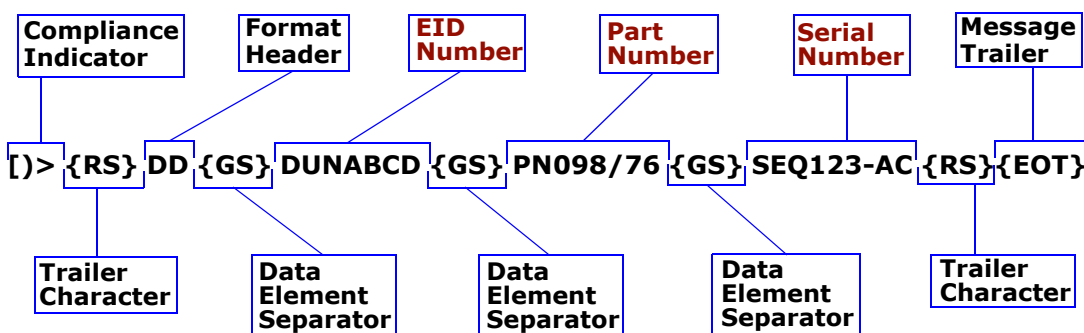
UID Elements

UID numbers come in two forms, called **Construct 1** and **Construct 2**. The following is an example of Construct 2. Construct 1 is identical, except that it doesn't include a part number. Construct 2 is composed of three basic elements:



Encoding a UID

The information in a Data Matrix UID also includes a compliance indicator, data qualifiers, and data element separators. None of these elements are part of the final UID number. When UID-Only Mode is enabled in the MS-Q, the characters that are not part of the UID number are removed from the decoded symbol data. Only characters that make up the UID number are passed on to the host computer. Otherwise, the symbol is rejected.



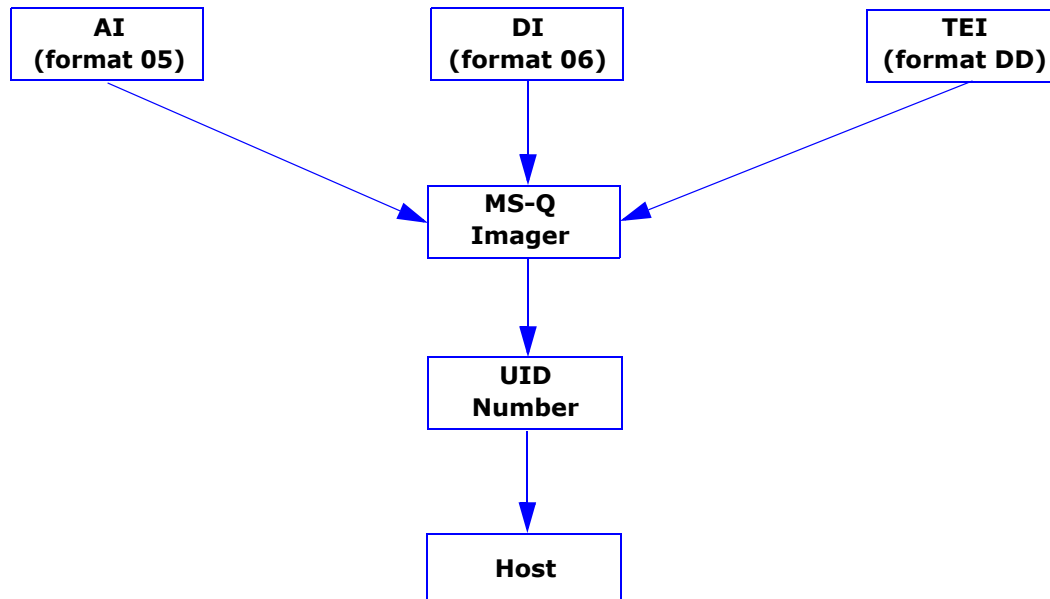
Non-UID Characters in a UID Message Stream

The table below identifies and describes all characters in a UID message stream that are not part of the final UID number sent to the host.

Table: Non-UID Characters in a UID Message Stream

<i>Compliance Indicator</i>	Identifies to the Imager that the symbol contains a UID number.
<i>Format Header</i>	Describes the type of data qualifier used. These qualifiers include AI (format 05), DI (format 06), and TEI (format DD).
<i>Trailer Character</i>	An ASCII character that separates the compliance indicator from the format header information, and also appears at the end of the message stream.
<i>Data Element Separator</i>	An ASCII character used to separate data fields.
<i>Message Trailer</i>	Identifies the end of the message within the data stream.
<i>Data Qualifier</i>	Defines each data element placed in the UID message stream.

When a message stream in any of the three formats is read by the Imager, non-UID characters are omitted and the UID is sent to the host.



UID Mode Features

UID Mode Features

Table: Features of UID Mode

<i>UID-Only Enabled</i>	Allows the MS-Q to read <i>only</i> UID message streams encoded in ECC 200 Data Matrix symbols and to send the UID output to the host computer. The Imager will not read any other symbol data when UID-Only is enabled.
<i>UID-Only Enabled with Error Messaging</i>	Allows the MS-Q to read <i>only</i> UID message streams encoded in ECC 200 Data Matrix symbols and to send the UID output to the host computer. In addition, the Imager will send an error message to the host if the UID message stream is invalid.
<i>UID Enabled with Pass Through</i>	Allows both UID-encoded symbols and non-UID symbols to be decoded and sent to the host.
<i>UID Enabled with Error Messaging and Pass Through</i>	Allows the MS-Q to decode UID symbols and non-UID symbols, and to provide error messages if the UID message stream is invalid.

UID Mode Command Symbols

The following symbols control UID functions:



Q014_01

UID-Only Enabled



Q015_01

UID-Only Enabled with Error Messaging



Q016_01

UID Enabled with Pass Through



Q017_01

UID Enabled with Error Messaging and Pass Through



Q018_01

UID Disabled (default)

Each of these commands can also be enabled in **ESP's "I/O Parameters"** section.

Save changes whenever you reconfigure Imager settings.

Clear XML Rules



M052_01

Clear all Data



M071_01

Default to PS2



M060_01

Default to USB



M049_01

Save Settings



M188_02

Error Messaging

This feature is used to validate that UID message streams are in the correct format. When Error Messaging is enabled, the MS-Q sends a message to the host indicating an error every time a bad symbol is read. The table below shows examples of error messages.

Table: Examples of error messages

<i>Invalid Format Header</i>	[>{RS}> 15 {GS}800406141411A0B9C3D6{RS}{EOT} Error message: "Invalid UID Format Header"	
<i>Invalid AI</i>	(01 + 21) [>{RS}05{GS}0100061414199999{GS}> 31 1A0B9C3D6{RS}{EOT} Error message: "Invalid AI"	
<i>Invalid DI</i>	(UN + 12V + 1P + S) [>{RS}06{GS}> 12X 077991289{GS}1P4202435{GS}S10936{RS}{EOT} Error message: "Invalid DI"	
<i>Invalid TEI</i>	(D + CAG + SER) [>{RS}DD{GS}> CAX 987654{GS}SERMKLJHUIYD{RS}{EOT} Error message: "Invalid TEI"	
<i>Space in Data Qualifier</i>	[>{RS}05{GS}8 0040614 1411 A0 B9 C3D6{RS}{EOT} Error message: "Invalid AI (or DI or TEI depending on format in use)"	
<i>Lower Case Characters</i>	[>{RS}05{GS}800406141411 a 0B9C3 d 6{RS}{EOT} Error message: "Invalid Characters in Data"	

Save changes whenever you reconfigure Imager settings.



M188_02

Save Settings



M049_01

Default to USB



M060_01

Default to PS2



M071_01

Clear all Data



M052_01

Clear XML Rules

Error Messaging

Table: Examples of error messages (cont.)

Invalid Characters	[>{RS}05{GS}800406141411#0B9C3D6{RS}{EOT} Error message: "Invalid Characters in Data"	
UID Too Long	(Character limit: 78) [>{RS}05{GS}80021234567891123456789212345678931234567894123456789512345678961234567897123456789{RS}{EOT} Error message: "UID Too Long"	
Part Number Too Long	(Character limit: 32) [>{RS}DD{GS}DUNABCD{GS}PNO1234567891123456789212345678931234{GS}SEQ123-AC{RS}{EOT} Error message: "UID Part Number Too Long"	
Serial Number Too Long	(Character limit: 30) [>{RS}DD{GS}DUNABCD{GS}PNO098/76{GS}SEQ1234567891123456789212345678931{RS}{EOT} Error message: "UID Serial Number Too Long"	
EID Number Too Long	(Character limit: 13) [>{RS}DD{GS}DUN12345678911234211{GS}PNO98/76{GS}SEQ123-AC{RS}{EOT} Error message: "UID EID Too Long"	
Invalid Compliance Indicator	[>{RS}05{GS}800406141411A0B9C3D6{RS}{EOT} Error message: "Invalid UID Compliance Indicator"  The following symbol will read in UID with Pass Through mode, because the invalid compliance indicator suggests that the encoded characters form a non-UID message stream.	

Save changes whenever you reconfigure Imager settings.

Clear XML Rules



M052_01

Clear all Data



M071_01

Default to PS2



M060_01

Default to USB



M049_01

Save Settings



M188_02

Valid Formats

The table below shows examples of correctly encoded UID message streams and the decoded UID output.

Table: Examples of valid UID message streams and UID output.

<i>AI (Format 05)</i>	Encoded message stream: <code>[]>{RS}05{GS}0100061414199999{GS}211A0B9C3D6{RS}{EOT}</code> Decoded UID output: 000614141999991A0B9C3D6	
<i>DI (Format 06)</i>	Encoded message stream: <code>[]>{RS}06{GS}18SOCVA5674A36458{RS}{EOT}</code> Decoded UID output: DOCVA5674A36458	
<i>TEI (Format DD)</i>	Encoded message stream: <code>[]>{RS}DD{GS}CAG987654{GS}SERMK JHUIYD{RS}{EOT}</code> Decoded UID output: D987654MKLJHUIYD	

Save changes whenever you reconfigure Imager settings.



M188_02

Save
Settings

M049_01

Default
to USB

M060_01

Default
to PS2

M071_01

Clear
all Data

M052_01

Clear XML
Rules

Valid Formats

Appendices

Contents

Appendix A General Specifications	A-2
Appendix B Electrical Specifications	A-4
Appendix C Configuration Symbols	A-7
Appendix D Configuration Symbol Reference List	A-30

Appendix A — General Specifications

Mechanical

	Imager (without handle)	Handle
Height:	1.3" (33mm)	3.8" (96.5mm)
Width:	1.8" (46mm)	1.2" (30mm)
Depth:	4.3" (109mm)	1.4" (36mm)
Weight:	2.5 oz. (71.5g)	1.2oz. (59.8g)

Battery Weight: 2.1 oz. (69.5g)

Battery Blank Weight: 5 oz. (13.6g)

Cable Length: 6' (1.8m)

Environmental

Enclosure rating: IP54

Operating temperature: 0° to 40°C
(32° to 104°F)

Storage temperature: -20° to 60° C
(-4° to 140°F)

Humidity: 5 to 90% (non-condensing)

Battery Charge: USB (6-8hrs), RS-232
(6-8hrs) & battery charger (4hrs)

Battery Life: Battery with radio will support
4000 read/transmits per charge including
8 hours of standby interval.

CE Standards

Immunity: EN 55024

ESD: En 61000-4-2 Radiated RF:EN61000-4-3

Keyed Carrier: ENV50204 EFT: EN61000-4-4

Conducted RF: EN61000-4-6

Emissions: EN55022, Class B Radiated,
Class B Conducted

Light Collection Options

Sensor: CMOS, progressive scan, 1.33 MP
(1024 x 1280). 256 gray scale

Standard Resolution Field of View:

Near: 21.5° horizontal by 16.2° vertical

Far: 22.9° horizontal by 11.6° vertical

High Resolution Focal Point:

Near: 4" (101.6 mm)

Far: 9" (228.6 mm)

High Resolution Focal Point:

Near: 2.75" (70 mm)

Far: 4.5" (115 mm)

Sensor Array:

Near Field: 1024 by 640 (default)

Far Field: 1024 by 640 (default)

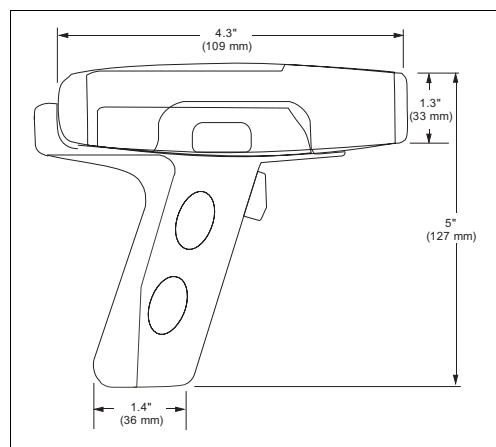


Figure A-1 MS-Q

Symbology Types

2D Symbologies: Data Matrix (ECC 200)

Read Parameters

Pitch: ±60° (front to back); Skew: ±60°;

Tilt: ±360°

Focal Range: 1 to 20" (25 to 508 mm)

Rotational Tolerance: ±180°

Print contrast Resolution: 25 to 508 mm); 35
percent (PDF417); absolute dark/light
reflectance differential, measure at 650 nm

Target Beam: Visible Laser Diode at 630 nm.
Class 2

Ambient Light Immunity: Sunlight: Up to
9000 ft. candles, 96,890 lux

Shock: Withstands multiple drops of 6.5'
(2 meters) to concrete

Indicators

LEDs: Memory status, Battery power, Success
ful decode and connection status

Programmable Indicators: Beep or Vibrate
options indicate Imager operation and
connection status

Image Output options

Format: JPEG, Raw (uncompressed)

Time Stamp: Interval logging

General Specifications

Communication Protocols

Standard Interface: USB

Optional Interface: RS-232, Bluetooth Class 1
Radio at 328' (100m)

Electrical

Power Requirement: 5 VDC

(mA) Typical: 310; Peak: 310, Sleep: 3

Bluetooth Radio at 295' (90m)

(mA) Typical: 280, Peak: 350, Idle: 96,
Sleep: 3

Bluetooth Radio at 33' (90m)

(mA) Typical: 260, Peak: 350, Idle: 96,
Sleep: 3

Battery Life: Battery with radio will support
4000 read/transmits per charge including 8
hours of standby interval

Safety Certifications

Designed for: FCC, CE

ISO Certification

ISO 9001/Cert. No. 00-1047

FIS Options

MS-Q, Quadrus Inside, High Density	FIS-6100-0001
MS-Q, Quadrus Inside, High Density, Battery/Batch	FIS-6100-0002
MS-Q, Quadrus Inside, High Density, Bluetooth	FIS-6100-0003
MS-Q, Quadrus Inside, Standard Density	FIS-6100-0004
MS-Q, Quadrus Inside, Standard Density, Battery/Batch	FIS-6100-0005
MS-Q, Quadrus Inside, Standard Density, Bluetooth	FIS-6100-0006
MS-Q, Quadrus Inside, High Density, PS2	FIS-6100-0007
MS-Q, Quadrus Inside, Standard Density, PS2	FIS-6100-0008
MS-Q, Basic	FIS-6150-0001
MS-Q, Basic, Battery/Batch	FIS-6150-0002
MS-Q, Basic, Bluetooth	FIS-6150-0003
MS-Q, Basic, PS2	FIS-6150-0004

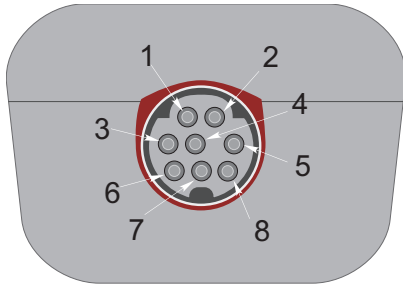
Accessories

Assy, 2-Bay Battery Charger, w/ USA P/S, MS-Q	98-000075-01
Assy, 2-Bay Battery Charger, w/ Europe P/S, MS-Q	98-000075-02
Assy, 2-Bay Battery Charger, w/ UK P/S, MS-Q	98-000075-03
Assy, Bluetooth modem, w/ USA P/S, MS-Q	98-000076-01
Assy, Bluetooth modem, w/ Europe P/S, MS-Q	98-000076-02
Assy, Bluetooth modem, w/ UK P/S, MS-Q	98-000076-03
Assy, 8" coiled cable, RS232 interface, w/ USA P/S, MS-Q	98-000074-01
Assy, 8" coiled cable, RS232 interface, w/ Europe P/S, MS-Q	98-000074-02
Assy, 8" coiled cable, RS232 interface, w/ UK P/S, MS-Q	98-000074-03

LightRay Optics FIS Options

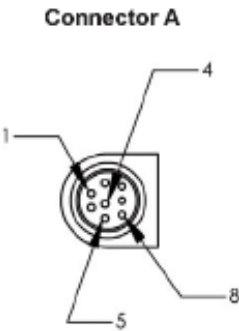
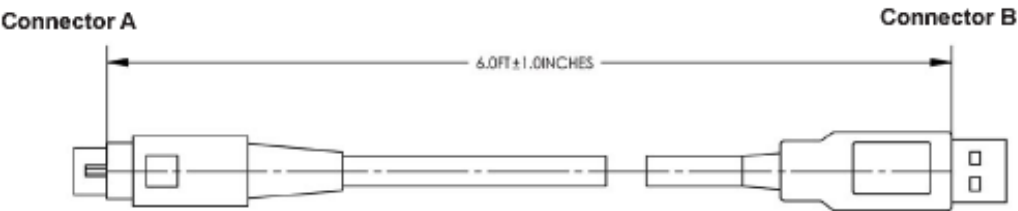
<i>MS-Q Quadrus with LRO 100</i>	<i>MS-Q Quadrus with LRO 200</i>	<i>LightRay Accessory Kits</i>
FIS-6100-1001 LRO 100	FIS-6100-2001 LRO 205	FIS-0001-0031 LRO 100
FIS-6100-1002 LRO 100	FIS-6100-2002 LRO 205	FIS-0001-0032 LRO 110
FIS-6100-1003 LRO 100	FIS-6100-2003 LRO 205	FIS-0001-0033 LRO 205
FIS-6100-1004 LRO 110	FIS-6100-2004 LRO 215	FIS-0001-0034 LRO 215
FIS-6100-1005 LRO 110	FIS-6100-2005 LRO 215	
FIS-6100-1006 LRO 110	FIS-6100-2006 LRO 215	
FIS-6100-1007 LRO 100	FIS-6100-2007 LRO 205	
FIS-6100-1008 LRO 110	FIS-6100-2008 LRO 215	

Appendix B — Electrical Specifications



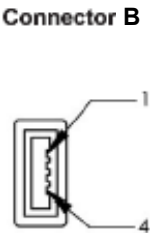
PIN 1	VIN- Input Voltage to the voltage regulators/battery charging IC
PIN 2	RS232_TX - RS-232 level serial transmit signal
PIN 3	RS232_RX - RS-232 level serial receive signal
PIN 4	PS2_DATA_UART_RX_USB_DP - PS2 clk to host/ UART transmit signal/ USB Data plus signal
PIN 5	PS2_DATA_UART_RX_USB_DM - PS2 data to host or keyboard/ UART receive signal/ USB Data minus signal
PIN 6	PS2_CLK_KB - PS2 clock signal to the keyboard
PIN 7	~TRIG - trigger from the handle
PIN 8	GND - signal ground
Shield	Shield Ground

USB Cable Pinouts



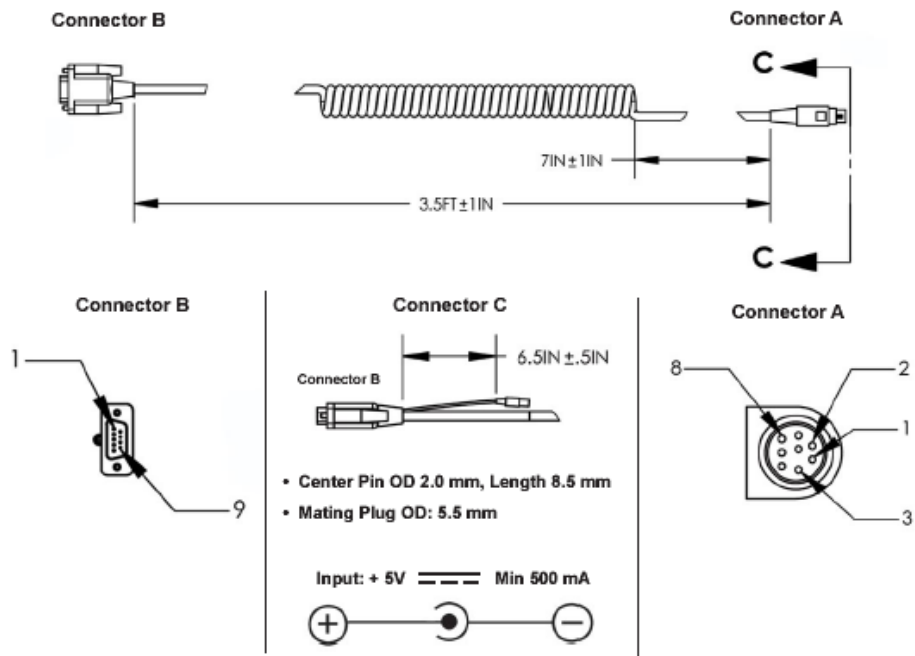
WIRING TABLE:

CONN A	NAME	WIRE	COLOR	CONN B
1	V+	24AWG	RED	1
2	NC			
3	NC			
4	D+	28AWG	GREEN (TWISTED)	3
5	D-	28AWG	WHITE (TWISTED)	2
6	NC			
7	NC			
8	GND	24AWG	BLACK	4
SHELL	—	DRAIN	BARE	SHELL



Electrical Specifications

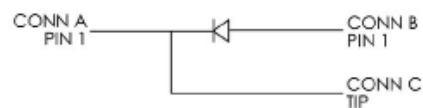
RS-232 Cable Pinouts



WIRING DIAGRAM:

CONN A	NAME	WIRE	COLOR	CONN B	WIRE	COLOR	CONN C
1	V+	24AWG	RED	1	24AWG	RED	TIP
2	TX	24AWG	BROWN	2			
3	RX	24AWG	ORANGE	3			
4	NC						
5	NC						
6	NC						
7	NC						
8	GND	24AWG	BLACK	5	24AWG	BLACK	RING
9	NC						
SHELL	—	DRAIN	BAFE	SHELL			

* SEE WIRING DIAGRAM BELOW FOR CONN A PIN 1, CONN B PIN 1 AND CONN C TIP



Appendix C — Configuration Symbols

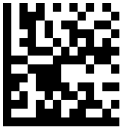
 M001_01 Global Optimization A1	 M002_01 Global Optimization A2	 M003_01 Global Optimization A3	 M004_01 Global Optimization B1
 M005_01 Global Optimization B2	 M006_01 Global Optimization B3	 M007_01 Global Optimization C1	 M008_01 Global Optimization C2
 M009_01 Global Optimization C3	 M010_01 Global Optimization D1	 M011_01 Global Optimization D2	 M012_01 Global Optimization D3
 M013_01 Handle Trigger Opt. A1	 M014_01 Handle Trigger Opt. A2	 M015_01 Handle Trigger Opt. A3	 M016_01 Handle Trigger Opt. B1

 M188_02 Save Settings	 M049_01 Default to USB	 M060_01 Default to PS2	 M071_01 Clear all Data	 M052_01 Clear XML Rules
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Configuration Symbols

 M017_01 Handle Trigger Opt. B2	 M018_01 Handle Trigger Opt. B3	 M019_01 Handle Trigger Opt. C1	 M020_01 Handle Trigger Opt. C2	
 M021_01 Handle Trigger Opt. C3	 M022_01 Handle Trigger Opt. D1	 M023_01 Handle Trigger Opt. D2	 M024_01 Handle Trigger Opt. D3	
 M025_01 Left Button Opt. A1	 M026_01 Left Button Opt. A2	 M027_01 Left Button Opt. A3	 M028_01 Left Button Opt. B1	
 M029_01 Left Button Opt. B2	 M030_01 Left Button Opt. B3	 M031_01 Left Button Opt. C1	 M032_01 Left Button Opt. C2	
 M033_01 Left Button Opt. C3	 M034_01 Left Button Opt. D1	 M035_01 Left Button Opt. D2	 M036_01 Left Button Opt. D3	
Clear XML Rules  M052_01	Clear all Data  M071_01	Default to PS2  M060_01	Default to USB  M049_01	Save Settings  M188_02

Configuration Symbols

 M037_01 Right Button Opt. A1	 M038_01 Right Button Opt. A2	 M039_01 Right Button Opt. A3	 M040_01 Right Button Opt. B1
 M041_01 Right Button Opt. B2	 M042_01 Right Button Opt. B3	 M043_01 Right Button Opt. C1	 M044_01 Right Button Opt. C2
 M045_01 Right Button Opt. C3	 M046_01 Right Button Opt. D1	 M047_01 Right Button Opt. D2	 M048_01 Right Button Opt. D3
 M049_01 Default to USB	 M050_01 Clear Memory	 M051_01 Clear RF Settings	 M052_01 Clear XML Rules
 M053_01 (Symbol Currently Unavailable)	 M054_01 Laser Off	 M055_01 Laser On	 M056_01 Laser Low

 M188_02 Save Settings	 M049_01 Default to USB	 M060_01 Default to PS2	 M071_01 Clear all Data	 M052_01 Clear XML Rules
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Configuration Symbols

 M057_01 Laser Medium	 M058_01 Laser High	 M059_01 spx15200:8N1	 M060_01 Default to PS2	
 M061_01 Symbol Readability Index Rule	 M062_01 Readability Index Output Enable	 M063_01 Readability Index Output Disable	 M064_01 USB Image Upload	
 M065_01 Bluetooth Auto Disconnect Off	 M066_01 Bluetooth Auto Disconnect On	 M067_01 Bluetooth Auto Connect Off	 M068_01 Bluetooth Auto Connect On	
 M069_01 Disable Auto Transfer Buffer Memory	 M070_01 Enable Auto Transfer Buffer Memory	 M071_01 Clear All Stored Data	 M072_01 Log Only Mode	
 M073_01 RS-232 Batch	 M074_01 RS-232 Cabled	 M075_01 Send and Buffer Mode	 M076_01 Send and Log Mode	
Clear XML Rules  M052_01	Clear all Data  M071_01	Default to PS2  M060_01	Default to USB  M049_01	Save Settings  M188_02

Configuration Symbols

 M077_02 Transfer All Data In Memory	 M078_02 Transfer Only Unsent Data In Memory	 M079_01 Continuous Trigger Opt. A1	 M080_01 Continuous Trigger Opt. A2	
 M081_01 Continuous Trigger Opt. A3	 M082_01 Continuous Trigger Opt. B1	 M083_01 Continuous Trigger Opt. B2	 M084_01 Continuous Trigger Opt. B3	
 M085_01 Continuous Trigger Opt. C1	 M086_01 Continuous Trigger Opt. C2	 M087_01 Continuous Trigger Opt. C3	 M088_01 Continuous Trigger Opt. D1	
 M089_01 Continuous Trigger Opt. D2	 M090_01 Continuous Trigger Opt. D3	 M091_01 Continuous Trigger Off	 M092_01 RS-232 Baud 1200	
 M093_01 RS-232 Baud 2400	 M094_01 RS-232 Baud 4800	 M095_01 RS-232 Baud 9600	 M096_01 RS-232 Baud 19200	
 M188_02 Save Settings	 M049_01 Default to USB	 M060_01 Default to PS2	 M071_01 Clear all Data	 M052_01 Clear XML Rules

Configuration Symbols

 M097_01 RS-232 Baud 38400	 M098_01 RS-232 Baud 57600	 M099_01 RS-232 Baud 115200	 M100_01 RS-232 7 Data Bits	
 M101_01 RS-232 8 Data Bits	 M102_01 RS-232 Parity Even	 M103_01 RS-232 Parity None	 M104_01 RS-232 Parity Odd	
 M105_01 RS-232 1 Data Bit	 M106_01 RS-232 2 Data Bits	 M107_01 Vibrate On/Beep On	 M108_01 Vibrate Off/Beep On	
 M109_01 Vibrate On/Beep Off	 M110_01 Beep Off	 M111_01 Beep Low	 M112_01 Beep High	
 M113_01 Disable Pairing, Auth, Encrypt	 M114_01 Disconnect	 M115_01 Encrypt, Enable-Pairing, Auth	 M116_01 Inquire and Connect	
Clear XML Rules  M052_01	Clear all Data  M071_01	Default to PS2  M060_01	Default to USB  M049_01	Save Settings  M188_02

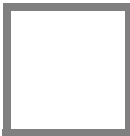
Configuration Symbols

 M117_01 Enable Pairing	 M118_01 RF Com Cable	 M119_01 Bluetooth Timeout 1 Hour	 M120_01 Bluetooth Timeout 2 Hours	
 M121_01 Bluetooth Timeout 5 Minutes	 M122_01 Bluetooth Timeout 10 Minutes	 M123_01 Bluetooth Timeout 15 Minutes	 M124_01 Bluetooth Timeout 30 Minutes	
 M125_01 Bluetooth Timeout 90 Seconds	 M126_01 PS2 Mode	 M127_01 RF One-Way Mode Max Range	 M128_01 RF One-Way Mode Max Reliability	
 M129_02 RF Two-Way Mode	 M130_01 RF Com Enable	 M131_01 RS-232 Mode	 M132_01 RS-232 Two-Way Mode	
 M133_01 USB Mode	 M134_01 USB Keyboard Mode	 M135_04 USB Native Two-Way Mode	 M136_01 Continuous Scan Cabled/Sleep 2 Hrs.	
 M188_02 Save Settings	 M049_01 Default to USB	 M060_01 Default to PS2	 M071_01 Clear all Data	 M052_01 Clear XML Rules

Configuration Symbols

 M137_01 Continuous Scan Cabled/Sleep Always	 M138_01 Continuous Scan Near and Far Fields	 M139_01 Continuous Scan Far Field ONLY	 M140_01 Continuous Scan Near Field ONLY	
 M141_01 Continuous Scan Off	 M142_01 Continuous Scan Trig. Delays 0 Sec.	 M143_01 Continuous Scan Trig. Delays 1 Sec.	 M144_01 Continuous Scan Trig. Delays 3 Sec.	
 M145_01 Continuous Scan Uncabled/Sleep 5 Min.	 M146_01 Continuous Scan Uncabled/Sleep 15 Min.	 M147_01 Continuous Scan Uncabled/Sleep 30 Min.	 M148_01 Extra Long Decode Time	
 M149_01 LEDs for Non-Standard Inks On	 M150_01 LEDs for Non-Standard Inks Off	 M151_01 Long Decode Time	 M152_01 Normal Decode Time	
 M153_01 Imager ID and Firmware	 M154_01 Handle Trigger Take Picture	 M155_01 Handle Trigger Far Field ONLY	 M156_01 Handle Trigger Near Field ONLY	
Clear XML Rules  M052_01	Clear all Data  M071_01	Default to PS2  M060_01	Default to USB  M049_01	Save Settings  M188_02

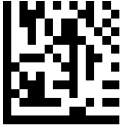
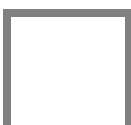
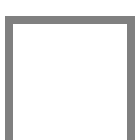
Configuration Symbols

 M157_01 Handle Trigger Near and Far Fields	 M158_01 Handle Trigger Upload Stored Data	 M159_02 Preamble-Comma	 M160_02 Postamble-Comma	
 M161_01 Postamble-Enter	 M162_01 (Symbol Currently Unavailable)	 M163_01 (Symbol Currently Unavailable)	 M164_02 Preamble-Space	
 M165_02 Postamble-Space	 M166_01 Preamble Tab-Default to USB	 M167_02 Postamble Tab-USB or Keyboard Mode	 M168_01 Postamble Carriage Return	
 M169_02 Postamble Line Feed	 M170_02 Postamble Carriage Return, Line Feed	 M171_01 Custom Keyboard	 M172_01 US Keyboard Mapping	
 M173_01 Universal Keyboard Mapping	 M174_01 Control LEDs Separately-True	 M175_01 Control LEDs Separately-False	 M176_01 Left Button Read Symbol-Far Field	
 M188_02 Save Settings	 M049_01 Default to USB	 M060_01 Default to PS2	 M071_01 Clear all Data	 M052_01 Clear XML Rules

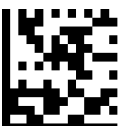
Configuration Symbols

 M177_01 Left Button Read Symbol-Near Field	 M178_01 Left Button Read Symbol-Both	 M179_01 Left Button Take Picture	 M180_01 Left Button Upload Stored Data	
 M181_02 Mirroring Off	 M182_01 Mirroring On	 M183_01 Right Button Read Symbol-Far Field	 M184_01 Right Button Read Symbol-Near Field	
 M185_01 Right Button Read Symbol-Both	 M186_01 Right Button Take Picture	 M187_01 Right Button Upload Stored Data	 M188_02 Save Settings	
 M189_01 Set Targeting Zone Tolerances-50	 M190_01 Set Targeting Zone Tolerances-75	 M191_01 Set Targeting Zone Tolerances-100	 M192_01 Set Targeting Zone Tolerances-125	
 M193_01 Set Targeting Zone Tolerances-150	 M194_01 Set Targeting Zone Tolerances-200	 M195_01 Set Targeting Zone Tolerances-400	 M196_01 Set Targeting Zone Tolerances-1600	
Clear XML Rules  M052_01	Clear all Data  M071_01	Default to PS2  M060_01	Default to USB  M049_01	Save Settings  M188_02

Configuration Symbols

 M197_01 Imager Text Commands Off	 M198_01 Imager Text Commands On	 M199_01 Time Stamp Settings Off	 M200_01 Time Stamp Settings On	
 M201_02 Enable SXGA 1280x1024	 M202_02 Enable VGA 640x480	 M203_01 Enable SXGA Handle Trigger	 M204_01 Enable VGA Handle Trigger	
 M205_01 Enable SXGA Left Button	 M206_01 Enable VGA Left Button	 M207_01 Enable SXGA Right Button	 M208_01 (Symbol Currently Unavailable)	
 M209_01 1D Symbols Only	 M210_01 Small 2D Symbols Only	 M211_01 Medium 2D Symbols Only	 M212_01 Large 2D Symbols Only	
 M213_01 (Symbol Currently Unavailable)	 M214_02 Preamble Carriage Return/Line Feed	 M215_01 Disable Batch	 M216_01 Enable Batch	
 M188_02 Save Settings	 M049_01 Default to USB	 M060_01 Default to PS2	 M071_01 Clear all Data	 M052_01 Clear XML Rules

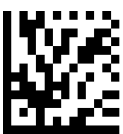
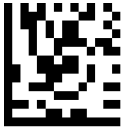
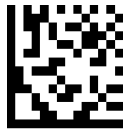
Configuration Symbols

 M217_01 Short Decode Time	 M218_02 Preamble-Tab RS-232 Serial Mode	 M219_02 Postamble-Tab RS-232 Mode	 M220_01 No Read Display Off
 M221_01 No Read Display On	 M222_01 Continuous Scan Screen Delay-0 Sec.	 M223_01 Continuous Scan Screen Delay-1 Sec.	 M224_01 Continuous Scan Screen Delay-3 Sec.
 M225_01 Disable AIM ID Preamble	 M226_01 Enable AIM ID Preamble	 M227_01 RS-232 Downloader Baud 57600	 M228_01 RS-232 Downloader Baud 115200
 M229_01 "/" Command Dump Settings	 M230_01 Batch Enabled	 M231_01 Batch Disabled	 M232_01 Code 39 Extended Full ASCII Off
 M233_01 Code 39 Extended Full ASCII On	 M234_01 Code 39 Off	 M235_01 Code 39 On	 M236_01 Code 39 Disable Checksum
Clear XML Rules  M052_01	Clear all Data  M071_01	Default to PS2  M060_01	Default to USB  M049_01
			Save Settings  M188_02

Configuration Symbols

 M237_01 Code 39 Enable Checksum	 M238_01 Enable Checksum, Strip from Result	 M239_01 Data Matrix Inverse On	 M240_01 Data Matrix Inverse Off	
 M241_01 Data Matrix Rectangle Off	 M242_01 Data Matrix Rectangle On	 M243_01 Interleaved 2 of 5 Off	 M244_01 Interleaved 2 of 5 On	
 M245_02 Interleaved 2 of 5 Two Digits Off	 M246_01 Interleaved 2 of 5 Two Digits On	 M247_01 Interleaved 2 of 5 Four Digits Off	 M248_01 Interleaved 2 of 5 Four Digits On	
 M249_01 Disable I 2 of 5 Checksum	 M250_01 Enable I 2 of 5 Checksum	 M251_01 Enable I 2 of 5 Checksum, Remove	 M252_01 Postal Symbolologies Australian Post On	
 M253_01 Postal Symbolologies Japan Post On	 M254_01 Postal Symbolologies KIX	 M255_01 Postal Symbolologies Postnet and Planet On	 M256_01 Postal Symbolologies Planet On	
 M188_02 Save Settings	 M049_01 Default to USB	 M060_01 Default to PS2	 M071_01 Clear all Data	 M052_01 Clear XML Rules

Configuration Symbols

 M257_01 Postal Symbolologies Postnet On	 M258_01 Postal Symbolologies Royal Mail On	 M259_01 Postal Symbolologies Disable All	 M260_01 QR Code Off
 M261_01 QR Code On	 M262_01 QR Code Inverse On	 M263_01 Inverse and Standard On	 M264_01 QR Code Disable Checksum
 M265_01 QR Code Enable Checksum	 M266_01 All RSS Off	 M267_01 All RSS On	 M268_01 RSS Limited On
 M269_01 RSS Expanded On	 M270_01 RSS 14 Stacked On	 M271_01 RSS 14 and RSS 14 Truncated On	 M272_01 Aztec Off
 M273_01 Aztec On	 M274_01 Codabar Off	 M275_01 Codabar On	 M276_01 Codablock_F_Off

Clear XML
Rules



M052_01

Clear
all Data



M071_01

Default
to PS2



M060_01

Default
to USB



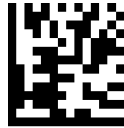
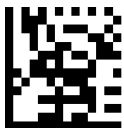
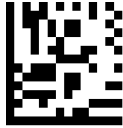
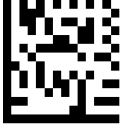
M049_01

Save
Settings



M188_02

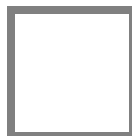
Configuration Symbols

 M277_01 Codablock_F_On	 M278_01 GoCode Off	 M279_01 GoCode On	 M280_01 Code 93 Off	
 M281_02 Code 93 On	 M282_01 Code 128 Off	 M283_01 Code 128 On	 M284_01 Composite Off	
 M285_01 Composite On	 M286_01 Macro PDF417 Off	 M287_01 Macro PDF417 On	 M288_01 Maxicode Off	
 M289_02 Maxicode On	 M290_01 MSI Plessy Off	 M291_01 MSI Plessy On	 M292_01 PDF 417 Off	
 M293_01 PDF417 On	 M294_01 UPC Off	 M295_01 UPC On	 M296_01 UPC Extension Off	
 M188_02 Save Settings	 M049_01 Default to USB	 M060_01 Default to PS2	 M071_01 Clear all Data	 M052_01 Clear XML Rules

Configuration Symbols

 M297_01 UPC Extension On	 M298_01 UPC Short Margin Disabled	 M299_01 UPC Short Margin Enabled	 M300_01 Micro PDF417 Off	
 M301_01 Micro PDF417 On	 M302_02 Preamble (in development)	 M303_02 Preamble (in development)	 M304_02 Preamble (in development)	
 M305_02 Preamble (in development)	 M306_02 Preamble (in development)	 M307_02 Preamble (in development)	 M308_02 Preamble (in development)	
 M309_02 Preamble (in development)	 M310_02 Preamble (in development)	 M311_02 Preamble (in development)	 M312_02 Preamble (in development)	
 M313_01 CodeXML Modem Baud 1200	 M314_01 CodeXML Modem Baud 2400	 M315_01 CodeXML Modem Baud 4800	 M316_01 CodeXML Modem Baud 9600	
Clear XML Rules  M052_01	Clear all Data  M071_01	Default to PS2  M060_01	Default to USB  M049_01	Save Settings  M188_02

Configuration Symbols

 M317_01 CodeXML Modem Baud 19200	 M318_01 CodeXML Modem Baud 38400	 M319_01 CodeXML Modem Baud 57600	 M320_01 CodeXML Modem Baud 115200	
 M321_01 CodeXML Modem Firmware Version	 M322_01 Turn Off Illumination	 M323_01 Highly Reflective Surface	 M324_01 Turn On Illumination	
 M325_01 Codabar Remove Start/Stop	 M326_01 Disable Rule 410	 M327_01 Enable Rule 410	 M328_01 AIM ID Config. Passthrough	
 M329_01 CodeXML Modem Baud 9600 7 E 1	 M330_01 (Symbol Currently Unavailable)	 M331_01 (Symbol Currently Unavailable)	 M332_01 (Symbol Currently Unavailable)	
 M333_01 Set TimeStamp Value 003000	 M334_01 Set TimeStamp Value 010000	 M335_01 Set TimeStamp Value 013000	 M336_01 Set TimeStamp Value 020000	
 M188_02 Save Settings	 M049_01 Default to USB	 M060_01 Default to PS2	 M071_01 Clear all Data	 M052_01 Clear XML Rules

Configuration Symbols

 M337_01 Set TimeStamp Value 023000	 M338_01 Set TimeStamp Value 030000	 M339_01 Set TimeStamp Value 033000	 M340_01 Set TimeStamp Value 040000	
 M341_01 Set TimeStamp Value 043000	 M342_01 Set TimeStamp Value 050000	 M343_01 Set TimeStamp Value 053000	 M344_01 Set TimeStamp Value 060000	
 M345_01 Set TimeStamp Value 063000	 M346_01 Set TimeStamp Value 070000	 M347_01 Set TimeStamp Value 073000	 M348_01 Set TimeStamp Value 080000	
 M349_01 Set TimeStamp Value 083000	 M350_01 Set TimeStamp Value 090000	 M351_01 Set TimeStamp Value 093000	 M352_01 Set TimeStamp Value 100000	
 M353_01 Set TimeStamp Value 103000	 M354_01 Set TimeStamp Value 110000	 M355_01 Set TimeStamp Value 113000	 M356_01 Set TimeStamp Value 120000	
Clear XML Rules  M052_01	Clear all Data  M071_01	Default to PS2  M060_01	Default to USB  M049_01	Save Settings  M188_02

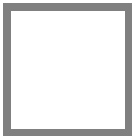
Configuration Symbols

 M357_01 Set TimeStamp Value 123000	 M358_01 Set TimeStamp Value 130000	 M359_01 Set TimeStamp Value 133000	 M360_01 Set TimeStamp Value 140000	
 M361_01 Set TimeStamp Value 143000	 M362_01 Set TimeStamp Value 150000	 M363_01 Set TimeStamp Value 153000	 M364_01 Set TimeStamp Value 160000	
 M365_01 Set TimeStamp Value 163000	 M366_01 Set TimeStamp Value 170000	 M367_01 Set TimeStamp Value 173000	 M368_01 Set TimeStamp Value 180000	
 M369_01 Set TimeStamp Value 183000	 M370_01 Set TimeStamp Value 190000	 M371_01 Set TimeStamp Value 193000	 M372_01 Set TimeStamp Value 200000	
 M373_01 Set TimeStamp Value 203000	 M374_01 Set TimeStamp Value 210000	 M375_01 Set TimeStamp Value 213000	 M376_01 Set TimeStamp Value 220000	
 M188_02 Save Settings	 M049_01 Default to USB	 M060_01 Default to PS2	 M071_01 Clear all Data	 M052_01 Clear XML Rules

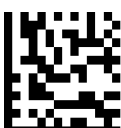
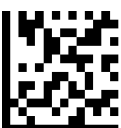
Configuration Symbols

 M377_01 Set TimeStamp Value 223000	 M378_01 Set TimeStamp Value 230000	 M379_01 Set TimeStamp Value 233000	 M380_01 Set TimeStamp Value 240000	
 M381_01 Preamble STX	 M382_01 Postamble ETXZ	 M383_01 Default to USB, LEDs, Active BT	 M384_01 Default to PS2, LEDs, Active BT	
 M385_01 Image Uploader JPEG	 M386_01 Image Uploader BMP	 M387_01 Image Uploader Far Field	 M388_01 Image Uploader Near Field	
 M389_01 Code 39 Narrow Margin Disable	 M390_01 Code 39 Narrow Margin Enable	 M391_01 Code 128 Narrow Margin Disable	 M392_01 Code 128 Narrow Margin Enable	
 M393_01 Code 11 Disable	 M394_01 Code 11 Enable Two Checksum Digits	 M395_01 Code 11 One Checksum Digit	 M396_01 Code 11 Two Checksum, Strip	
Clear XML Rules  M052_01	Clear all Data  M071_01	Default to PS2  M060_01	Default to USB  M049_01	Save Settings  M188_02

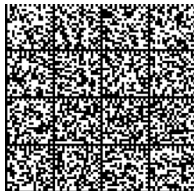
Configuration Symbols

 M397_01 Code 11 One Checksum, Strip	 M398_01 Code 128 Narrow Margin Disable	 M399_01 Code 128 Narrow Margin Enable	 M400_01 Code 39 Narrow Margin Disable	
 M401_01 Code 39 Narrow Margin Enable	 M402_01 Translate CRLF into Enter	 M403_01 (Symbol Currently Unavailable)	 M404_01 (Symbol Currently Unavailable)	
 M405_01 (Symbol Currently Unavailable)	 M406_01 (Symbol Currently Unavailable)	 M407_01 Reset to Default Save Settings, Reboot	 M408_01 Disable Pharmacode	
 M409_01 Enable Pharmacode No Color, Standard, Horiz., Normal	 M410_01 Enable Pharmacode Color, Relaxed, Horiz., Normal	 M411_01 Enable Pharmacode No Color, Standard, Vert., Normal	 M412_01 Enable Pharmacode Color, Relaxed, Vert., Normal	
 M413_01 Enable Pharmacode No Color, Standard, Horiz., Reverse	 M414_01 Enable Pharmacode Color, Relaxed, Horiz., Reverse	 M415_01 Enable Pharmacode No Color, Standard, Vert., Reverse	 M416_01 Enable Pharmacode Color, Relaxed, Vert., Reverse	
 M188_02 Save Settings	 M049_01 Default to USB	 M060_01 Default to PS2	 M071_01 Clear all Data	 M052_01 Clear XML Rules

Configuration Symbols

 M417_01 RS-232 Suppress Imager Responses	 M418_01 RS-232 Default Settings, Enable One-Way Max. Range	 M419_01 RS-232 Enable Imager Responses	 M420_01 Replace All \\ with \ for PDF417
 M421_01 Set Top Buttons to Toggle Const. Trigger On/Off	 M422_01 RF Attempt to Connect Timeout, Default (30 sec.)	 M423_01 RF Attempt to Connect Timeout (15 Sec.)	 M424_01 USB Detect Out Endpoint
 M425_01 USB Use Out Endpoint	 M426_01 USB Do Not Use Out Endpoint	 M427_01 RF Timeout-6 Hrs.	 M428_01 Settings Unlocked (Except Imager ID)
 M429_01 Settings Locked	 M430_01 Reboot Imager	 Q001_01 Left Button Switching	 Q002_01 Change IP Mode Standard (default)
 Q003_01 Change IP Mode Mode 1	 Q004_01 Change IP Mode Basic Mode	 Q005_01 ECC 0-140 On	 Q006_01 ECC 0-140 Off
Clear XML Rules  M052_01	Clear all Data  M071_01	Default to PS2  M060_01	Default to USB  M049_01
Save Settings  M188_02			

Configuration Symbols

 Q007_01 Default LEDs	 Q008_01 IR Off Visible On	 Q009_01 Visible Off IR On (Near Field IR Off)	 Q010_01 Control IR Separately (Lower Intensity IR)	
 Q011_01 Disable Left Button	 Q012_01 Disable Right Button	 Q013_01 Disable Left and Right Buttons	 Q014_01 UID-Only Enabled	
 Q015_01 UID-Only Enabled with Error Messaging	 Q016_01 UID Enabled with Pass Through	 Q017_01 UID Enabled with Error Messaging and Pass Through	 Q018_01 UID Disabled	
 Q019_01 Enable 2-Symbol Read	 Q020_01 Disable 2-Symbol Read	 Q021_01 Laser Off, Visible Off, IR On at 100%	 Q022_01 Laser On, Visible Off, IR On at 100%	
 Q023_01 Laser Off, All LEDs On at 100%	 Q024_01 Laser On, All LEDs On at 100%	 Q025_01 USB Battery Charge Mode	 Q026_01 Default to Previous Settings	
 M188_02 Save Settings	 M049_01 Default to USB	 M060_01 Default to PS2	 M071_01 Clear all Data	 M052_01 Clear XML Rules

Appendix D — Configuration Symbol Reference List

M001	01	Global Optimization - A1
M002	01	Global Optimization - A2
M003	01	Global Optimization - A3
M004	01	Global Optimization - B1
M005	01	Global Optimization - B2
M006	01	Global Optimization - B3
M007	01	Global Optimization - C1
M008	01	Global Optimization - C2
M009	01	Global Optimization - C3
M010	01	Global Optimization - D1
M011	01	Global Optimization - D2
M012	01	Global Optimization - D3
M013	01	Handle Trigger Optimization - A1
M014	01	Handle Trigger Optimization - A2
M015	01	Handle Trigger Optimization - A3
M016	01	Handle Trigger Optimization - B1
M017	01	Handle Trigger Optimization - B2
M018	01	Handle Trigger Optimization - B3
M019	01	Handle Trigger Optimization - C1
M020	01	Handle Trigger Optimization - C2
M021	01	Handle Trigger Optimization - C3
M022	01	Handle Trigger Optimization - D1
M023	01	Handle Trigger Optimization - D2
M024	01	Handle Trigger Optimization - D3
M025	01	Left Button Optimization - A1
M026	01	Left Button Optimization - A2
M027	01	Left Button Optimization - A3
M028	01	Left Button Optimization - B1
M029	01	Left Button Optimization - B2
M030	01	Left Button Optimization - B3
M031	01	Left Button Optimization - C1
M032	01	Left Button Optimization - C2
M033	01	Left Button Optimization - C3
M034	01	Left Button Optimization - D1
M035	01	Left Button Optimization - D2
M036	01	Left Button Optimization - D3

Configuration Symbol Reference List

M037	01	Right Button Optimization - A1
M038	01	Right Button Optimization - A2
M039	01	Right Button Optimization - A3
M040	01	Right Button Optimization - B1
M041	01	Right Button Optimization - B2
M042	01	Right Button Optimization - B3
M043	01	Right Button Optimization - C1
M044	01	Right Button Optimization - C2
M045	01	Right Button Optimization - C3
M046	01	Right Button Optimization - D1
M047	01	Right Button Optimization - D2
M048	01	Right Button Optimization - D3
M049	02	Default to USB
M050	01	Clear Memory
M051	02	Clear RF Settings
M052	01	Clear XML Rules - Prefix and Suffix
M054	01	Laser Settings - Off
M055	01	Laser Settings - On
M056	01	Laser Settings - Low
M057	01	Laser Settings - Medium
M058	01	Laser Settings - High
M059	01	spx15200:8N1
M060	01	Default to PS2
M061	01	Symbol Readability Index Rule
M062	01	Readability Index Output Enable
M063	01	Readability Index Output Disable
M064	01	USB Image Upload
M065	01	Bluetooth Radio Auto Disconnect Off
M066	01	Bluetooth Radio Auto Disconnect On
M067	01	Bluetooth Radio Auto Connect Off
M068	01	Bluetooth Radio Auto Connect On
M069	01	Disable Auto Transfer Buffer Memory
M070	01	Enable Auto Transfer Buffer Memory
M071	01	Clear All Stored Data
M072	01	Log Only Mode
M073	01	RS-232 Batch
M074	01	RS-232 Cabled
M075	01	Send & Buffer Mode
M076	01	Send & Log Mode
M077	02	Transfer All Data in Memory

Configuration Symbol Reference List

M078	02	Transfer Only Unsent Data in Memory
M079	01	Continuous Trigger Optimization - A1
M080	01	Continuous Trigger Optimization - A2
M081	01	Continuous Trigger Optimization - A3
M082	01	Continuous Trigger Optimization - B1
M083	01	Continuous Trigger Optimization - B2
M084	01	Continuous Trigger Optimization - B3
M085	01	Continuous Trigger Optimization - C1
M086	01	Continuous Trigger Optimization - C2
M087	01	Continuous Trigger Optimization - C3
M088	01	Continuous Trigger Optimization - D1
M089	01	Continuous Trigger Optimization - D2
M090	01	Continuous Trigger Optimization - D3
M091	01	Continuous Trigger Off
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Warranty iii

